



1641  
TRW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
(MBHB Case No. 00-1123-D)

In re Application of:

Cunningham *et al.*

Serial No.: 09/930,352

Filed: August 15, 2001

For: A Label-Free High-Throughput Optical  
Technique for Detecting Biomolecular  
Interactions

Group Art Unit: 1641

Examiner: Yang, Nelson C.

Conf. No. 3472

**TRANSMITTAL LETTER**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313

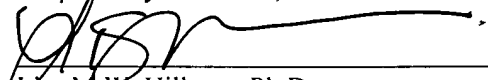
Dear Sir:

In regard to the above identified application,

1. We are transmitting herewith the attached:
  - a) Petition to the Director Under §1.181;
  - b) Exhibits A to E;
  - c) Return postcard
2. With respect to fees:
  - a) It is believed no fee is due at this time.
  - b) Please charge any underpayment or credit any overpayment our Deposit Account, No. 13-2490.
3. GENERAL AUTHORIZATION: Please charge any additional fees or credit overpayment to Deposit Account No. 13-2490. A duplicate copy of this sheet is enclosed.
4. CERTIFICATE OF MAILING UNDER 37 CFR § 1.8: The undersigned hereby certifies that this Transmittal Letter and the paper, as described in paragraph 1, are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on February 6, 2006.

Date: February 6, 2006

Respectfully submitted,

  
\_\_\_\_\_  
Lisa M.W. Hillman, Ph.D  
Registration No. 43,673



**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
(Case No. 00-1123-D)**

In application of:	)	
	)	
Cunningham et al.	)	
	)	Examiner: Yang
Serial No.: 09/930,352	)	
	)	Group Art Unit: 1641
Filed: August 15, 2001	)	
	)	Conf. No. 3472
For: A Label-Free High-Throughput Optical	)	
Technique for Detecting Biomolecular	)	
Interactions	)	

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**PETITION TO THE DIRECTOR UNDER §1.181**

Dear Sir:

A notice of abandonment was mailed in the above-mentioned application on January 30, 2006. The notice asserts that no response to the Office's letter of October 17, 2005 was received by the Office. The letter of October 17, 2005 was a request for corrected drawings, which set a two month period for response. On November 23, 2005, the Applicants submitted 29 sheets of corrected drawings under the provisions of 37 CFR §1.8.

Attached as Exhibit A is a copy of the transmittal form for the corrected drawings (listing 29 drawings), which has the necessary certification under 37 CFR §1.8. Attached as Exhibit B is a copy of the Response to Notice Regarding Drawings, which was mailed on November 23, 2005 with the above-mentioned transmittal form. Attached as Exhibit C are copies of the 29 sheets of corrected drawings, which were mailed on November 23, 2005 along with the above-mentioned papers. (The statement "Replacement Sheet" has been added in the upper margin of these drawings.) Attached as Exhibit D is a copy of the post card, which was mailed on November 23, 2005 with the above-mentioned papers. The Office stamped the postcard as received and returned the postcard to us. See Exhibit E.

The undersigned signed the certificate of transmission under 37 CFR §1.8 for the corrected drawings (See Exhibit A). The undersigned has personal knowledge that 29 sheets of corrected drawings (including a transmittal form, a Response to Notice Regarding Drawings, and a postcard) were mailed to the USPTO via first class mail on November 23, 2005.

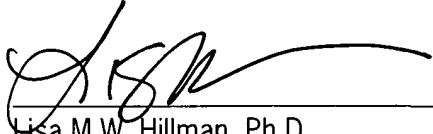
Applicants respectfully request withdrawal of the holding of abandonment of the above-mentioned application and entry of the corrected 29 sheets of drawings attached hereto in Appendix

C. Applicants furthermore request that the application be passed to issuance in a timely manner.  
Please contact the undersigned with any questions.

Respectfully submitted,

**Date:** February 6, 2006

**By:**

  
\_\_\_\_\_  
Lisa M.W. Hillman, Ph.D  
Registration No. 43,673



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
(MBHB Case No. 00-1123-D)

In re Application of:

Cunningham *et al.*

Serial No.: 09/930,352

Filed: August 15, 2001

For: A Label-Free High-Throughput Optical  
Technique for Detecting Biomolecular  
Interactions

Group Art Unit: 1641

Examiner: Yang, Nelson C.

Conf. No. 3472

**TRANSMITTAL LETTER**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313

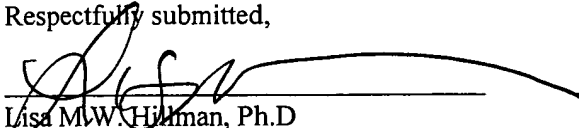
Dear Sir:

In regard to the above identified application,

1. We are transmitting herewith the attached:
  - a) Response to Notice Regarding Drawings;
  - b) 29 sheets of drawings
  - c) Return postcard
2. With respect to fees:
  - a) It is believed no fee is due at this time.
  - b) Please charge any underpayment or credit any overpayment our Deposit Account, No. 13-2490.
3. GENERAL AUTHORIZATION: Please charge any additional fees or credit overpayment to Deposit Account No. 13-2490. A duplicate copy of this sheet is enclosed.
4. CERTIFICATE OF MAILING UNDER 37 CFR § 1.8: The undersigned hereby certifies that this Transmittal Letter and the paper, as described in paragraph 1, are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on November 23, 2005.

Respectfully submitted,

Date: November 23, 2005

  
Lisa M.W. Hillman, Ph.D  
Registration No. 43,673



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
(MBHB Case No. 00-1123-D)

In re Application of:

Cunningham *et al.*

Serial No.: 09/930,352

Filed: August 15, 2001

For: A Label-Free High-Throughput Optical  
Technique for Detecting Biomolecular  
Interactions

Group Art Unit: 1641

Examiner: Yang, Nelson C.

Conf. No. 3472

**RESPONSE TO NOTICE REGARDING DRAWINGS**

Mail Stop Missing Parts  
Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

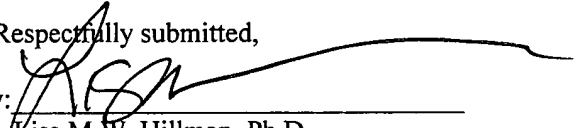
Dear Sir:

The attached 29 sheets of drawings are submitted in response to the Notice Regarding Drawings mailed on October 17, 2005, in the above-mentioned case. It is believed no fee is due at this time; however, if a fee is due the Commissioner is authorized to charge or credit our Deposit Account No. 13-2490.

Respectfully submitted,

Date: November 23, 2005

By:

  
Lisa M. W. Hillman, Ph.D  
Registration No.: 43,673

McDonnell, Boehnen,  
Hulbert & Berghoff LLP  
300 South Wacker Drive  
Chicago, IL 60606  
(312) 913-0001

1

**CERTIFICATE OF MAILING (37 C.F.R. 1.8a)**

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to the Mail Stop Missing Parts, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 23, 2005.

Date: November 23, 2005

  
Lisa M. W. Hillman, Ph.D

Hon. Commissioner of                      S/N 09/930,352                      Atty      LMWH  
Patents and Trademarks  
Re: Applicant - Cunningham                      Case No. 00-1123-D  
  
Label-Free High-Throughput Optical Technique For Detecting  
Biomolecular Interactions

Sir:      Please place the Patent Office receipt stamp hereon and mail to acknowledge receipt of:

- ☒ Transmittal Letter  
☒ Other Notice Regarding Drawings

Fee Enclosed

\$ -0-  
November 23, 2005

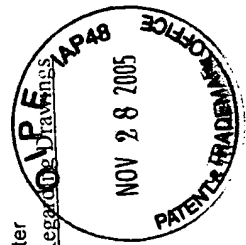
Respectfully,  
McDonnell Boehnen Hulbert & Berghoff  
Attorney for Applicant

Hon. Commissioner of  
Patents and Trademarks  
S/N 09/930,352  
Atty LAMWH  
Re: Applicant's  
Cunningham  
Case No. 00-1 23-D  
2885 Free High-Throughput Optical Technique For Detecting  
Biomolecular Interactions

Sir: Please place the Patent Office receipt stamp hereon and mail to acknowledge receipt of:

- ☒ Transmittal Letter
- ☒ Other Notice Regarding

Fee Enclosed  
\$ -0-  
November 23, 2005



Respectfully,  
McDonnell Boehnen Hulbert & Berghoff  
Attorney for Applicant

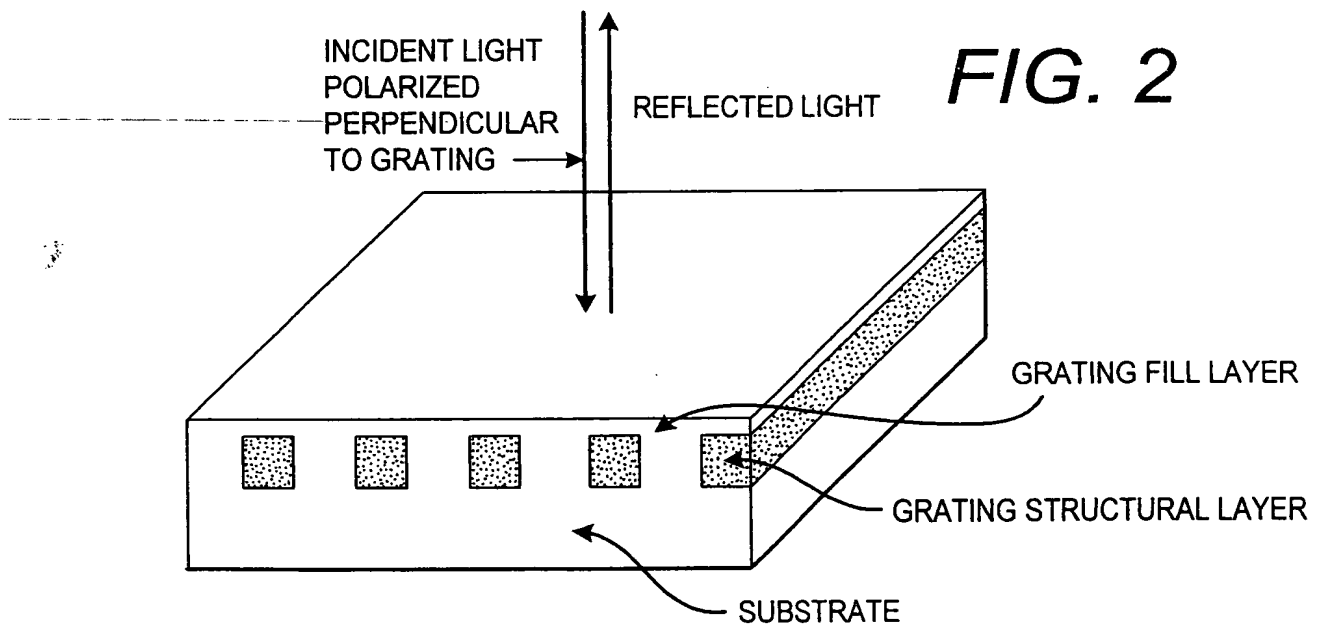
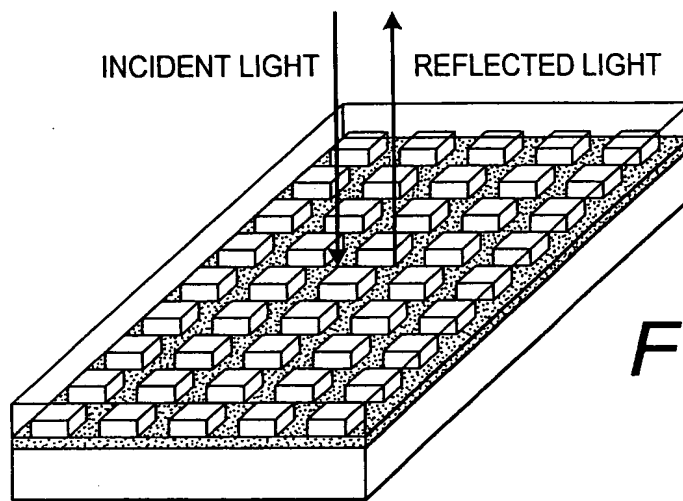
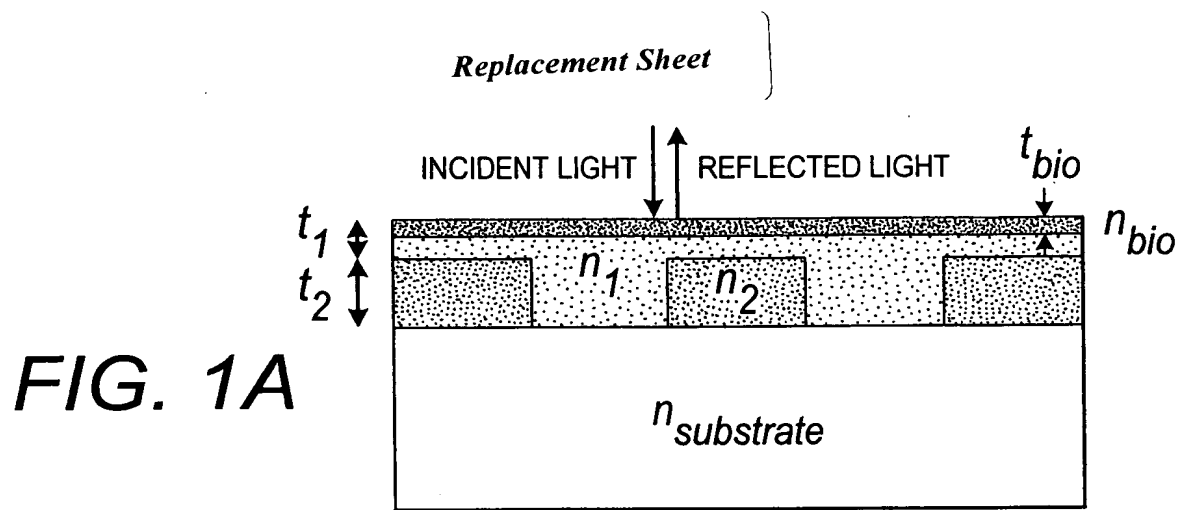




FIG. 3A

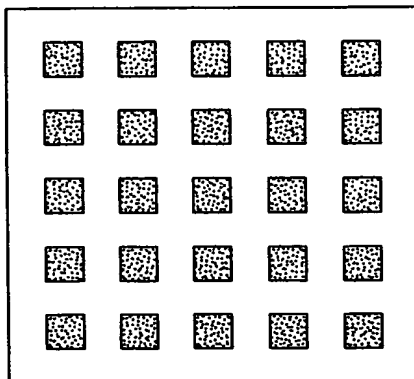


FIG. 3B

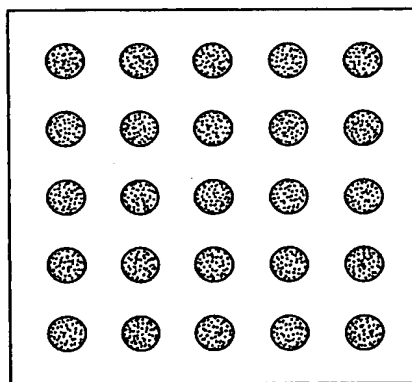
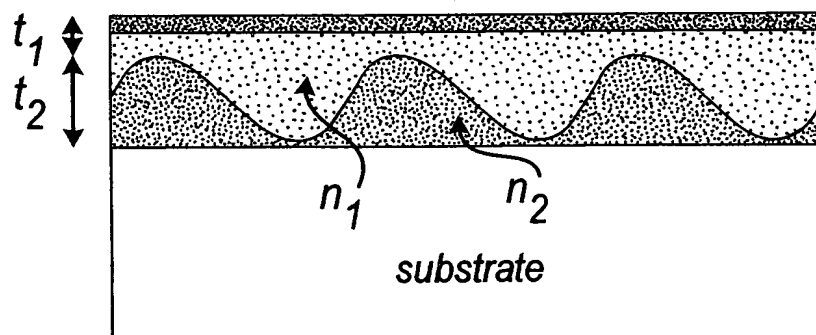
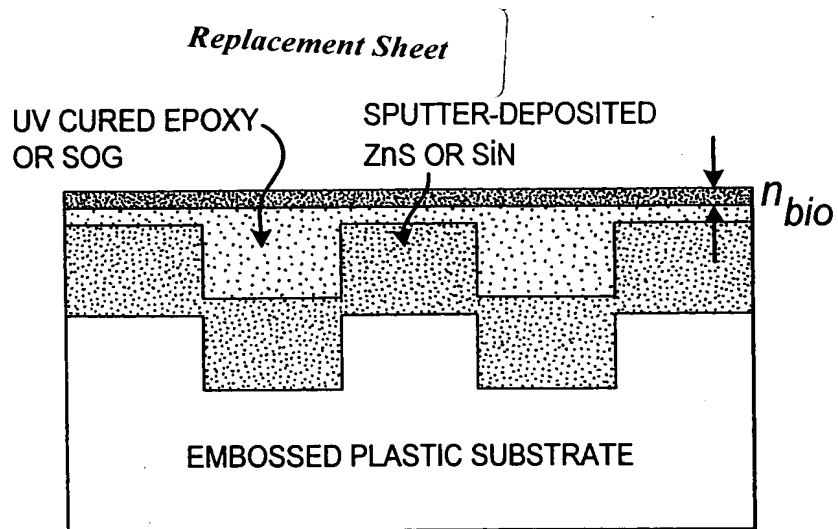


FIG. 4



**FIG. 5**



**FIG. 6**

- |          |   |   |
|----------|---|---|
| Amine    | { | <ul style="list-style-type: none"> <li>➤ Sulfo-succinimidyl-6-(biotinamido)hexanoate (Sulfo-NHS-LC-Biotin) <ul style="list-style-type: none"> <li>• Streptavidin / avidin then biotinylated molecule</li> </ul> </li> <li>➤ N,N'-disuccinimidyl carbonate (DSC); • - NH<sub>2</sub>, non-cleavable</li> <li>➤ Dimethyl pimelimidate (DMP); • - NH<sub>2</sub>, non-cleavable</li> <li>➤ Dimethyl 3,3'-dithiobispropionimidate (DTBP); • - NH<sub>2</sub>, cleavable</li> <li>➤ 1-Ethyl-3-(3-Dimethylaminopropyl)carbodiimide Hydrochloride (EDC) and n-Hydroxysulfosuccinimide (Sulfo-NHS); • - COOH</li> <li>➤ Sulfo-succinimidyl 6-[α-methyl-α-(2-pyridyl-dithio)toluamido] hexanoate (Sulfo-LC-SMPT); • - SH, cleavable</li> <li>➤ N-(B-Maleimidopropoxy)succinimide ester (BMPS) <ul style="list-style-type: none"> <li>• - SH<sub>2</sub>, non-cleavable</li> </ul> </li> <li>➤ Sulfo-succinimidyl 4-[N-maleimidomethyl]cyclohexane-1-carboxylate (Sulfo-SMCC); • - SH, non-cleavable</li> </ul> |
| Aldehyde | ➤ | <p>Directly with aldehyde of first amino the aldehyde</p> <ul style="list-style-type: none"> <li>• - NH<sub>2</sub></li> </ul>  |
| Ni(II)   | ➤ | <p>Using Nitrilotriacetic acid (NTA) group, which forms a chelate with Ni(II)</p> <ul style="list-style-type: none"> <li>• His-tagged molecules</li> </ul>  |

FIG. 7C

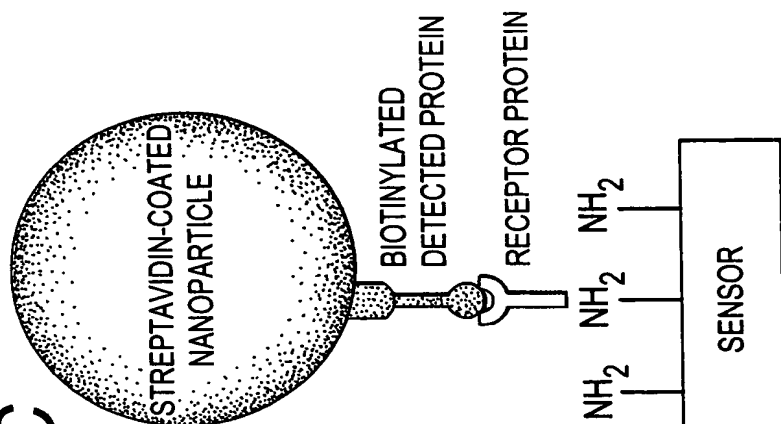


FIG. 7B

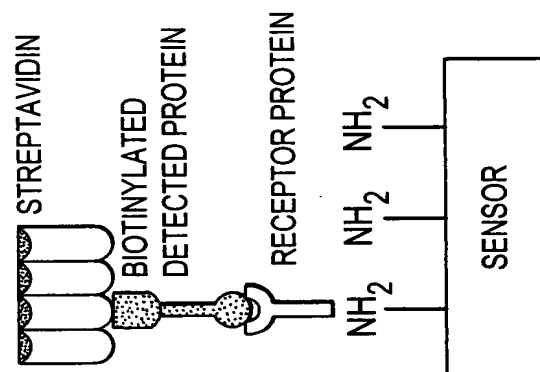


FIG. 7A

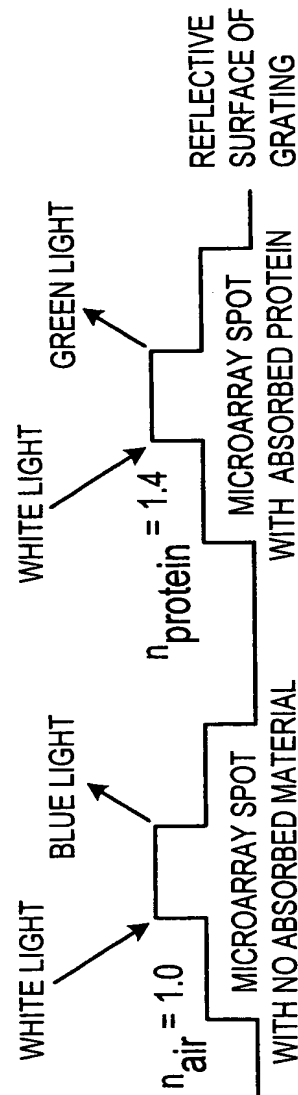
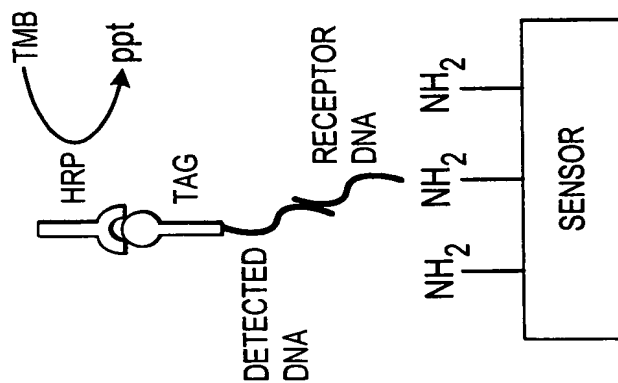
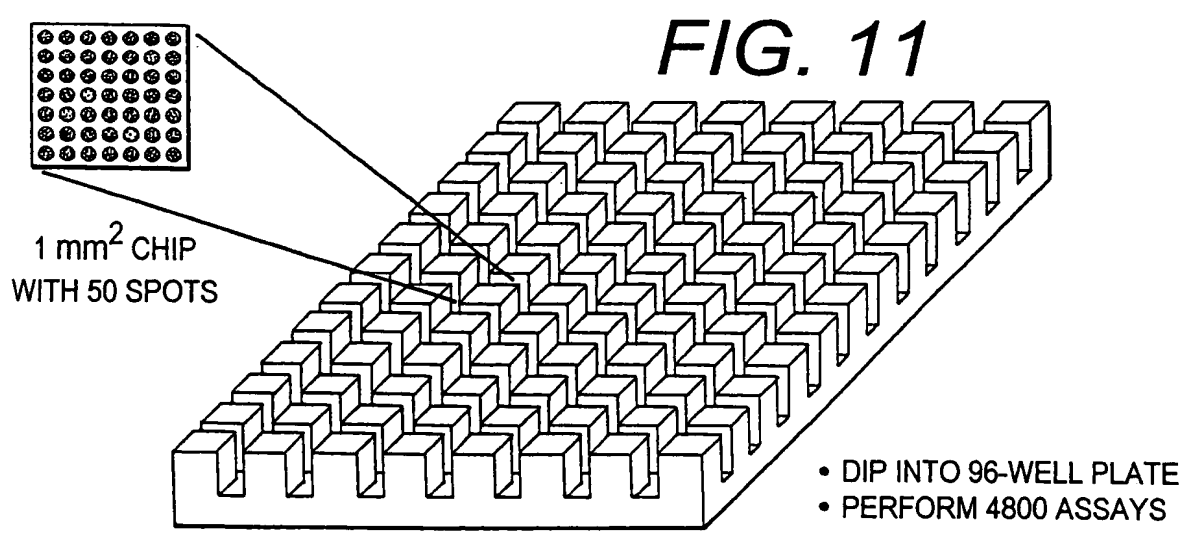
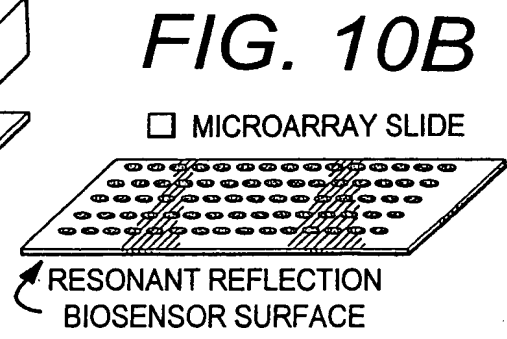
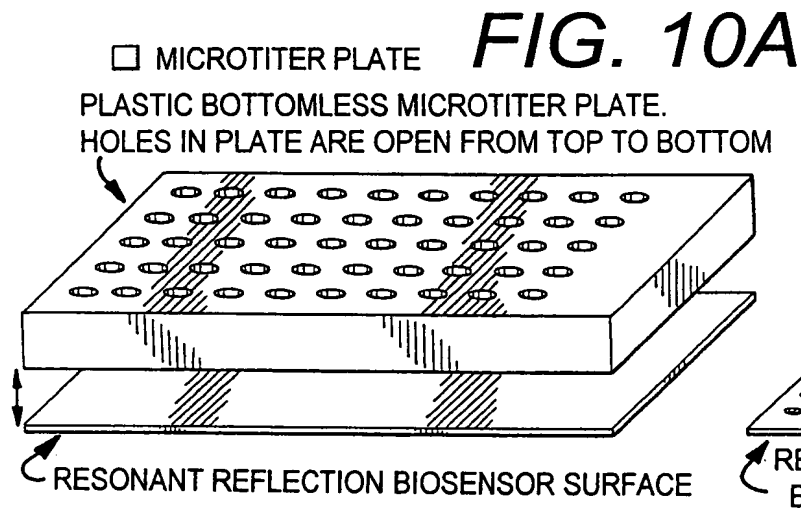
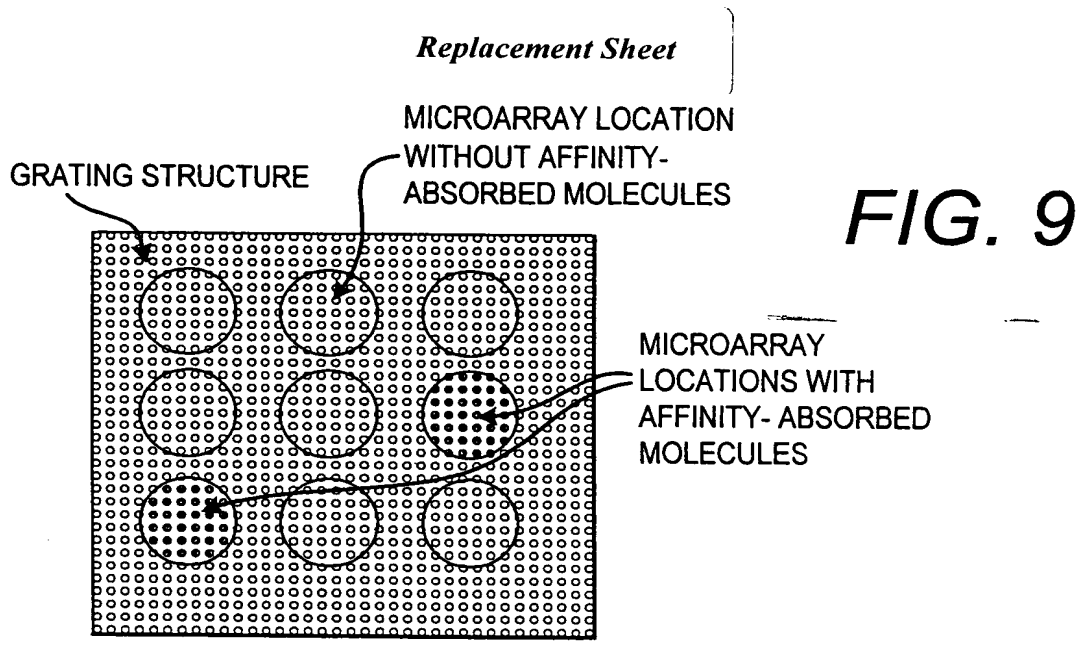
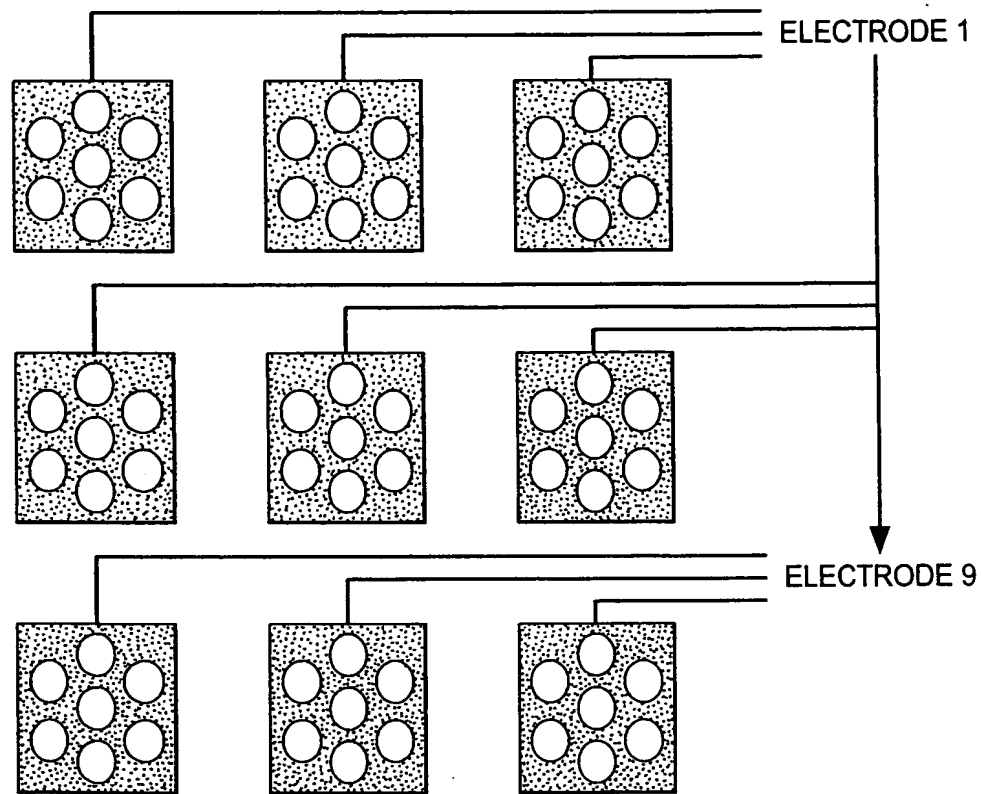


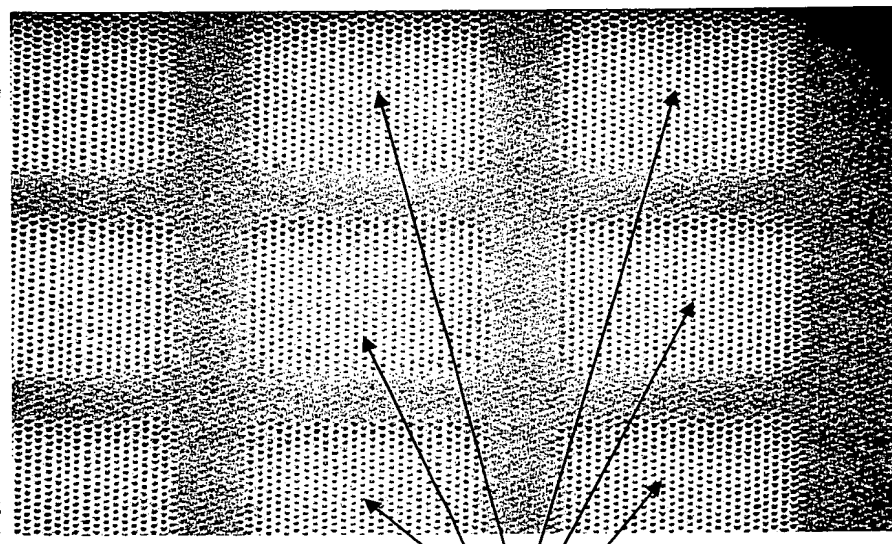
FIG. 8



**FIG. 12**



**FIG. 13**



SEPARATE ELECTRODE GRATING REGIONS

FIG. 14

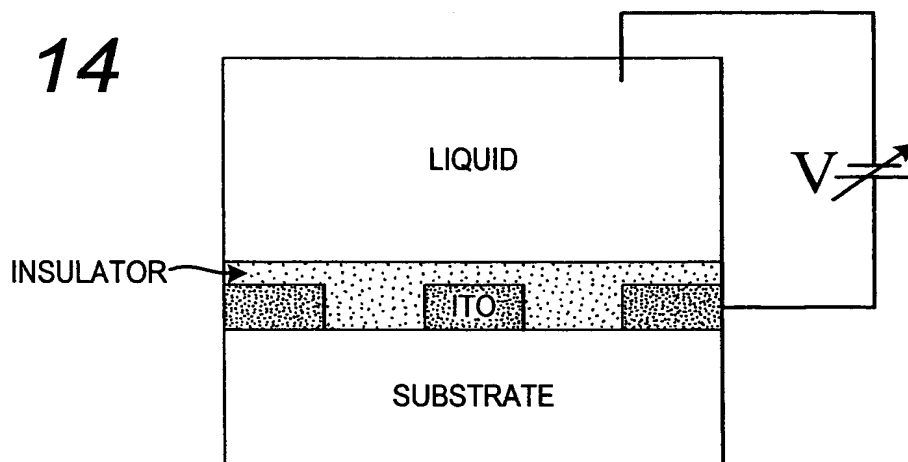


FIG. 15

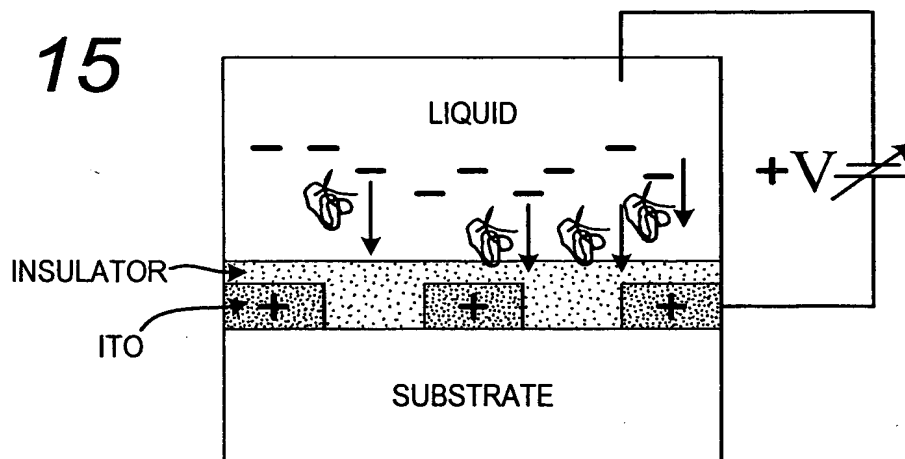


FIG. 16

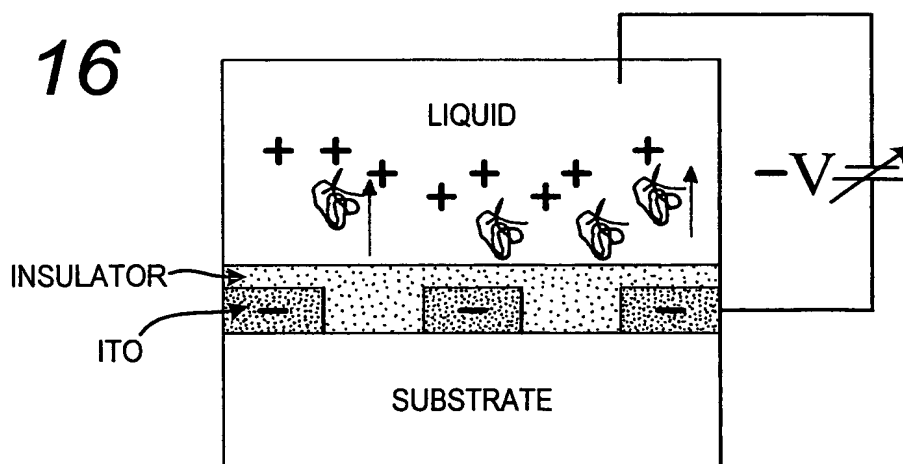


FIG. 17

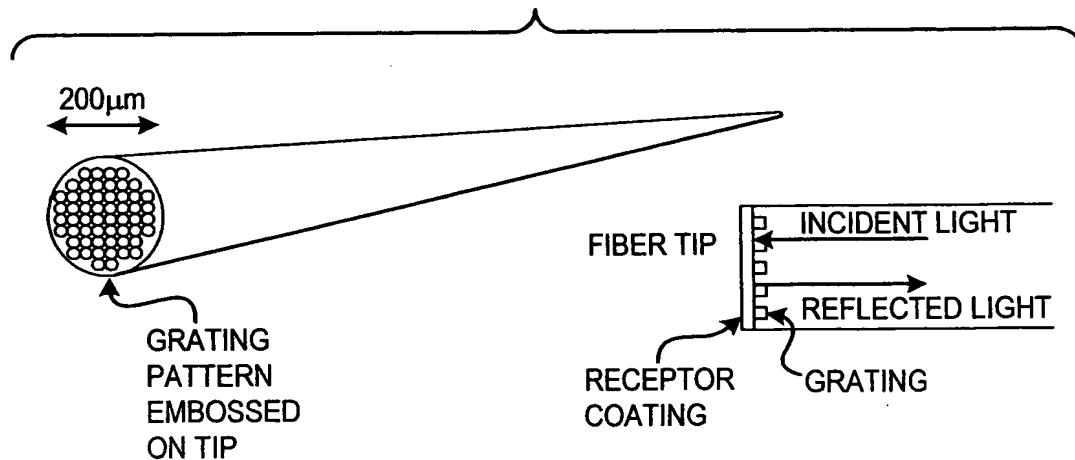
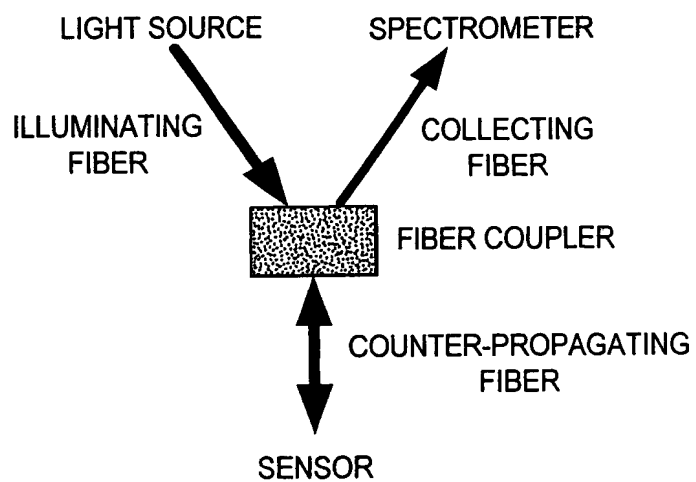
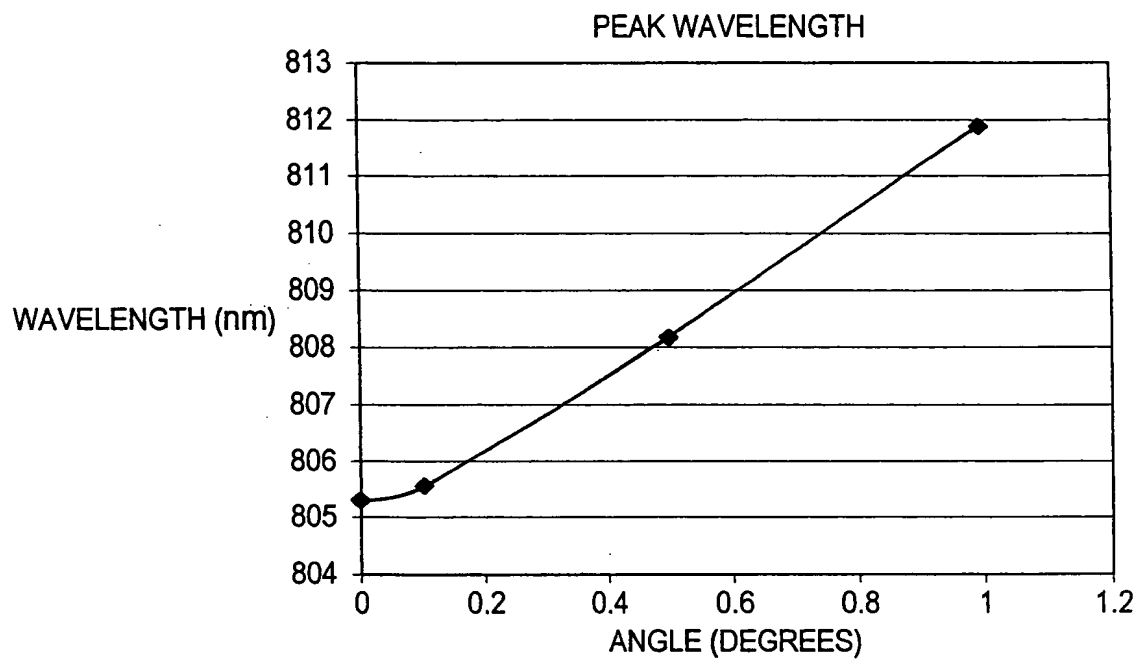


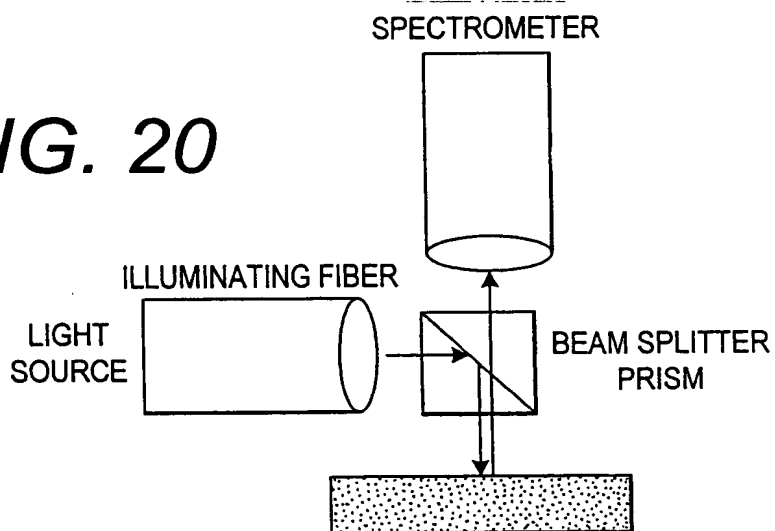
FIG. 18



**FIG. 19**



**FIG. 20**





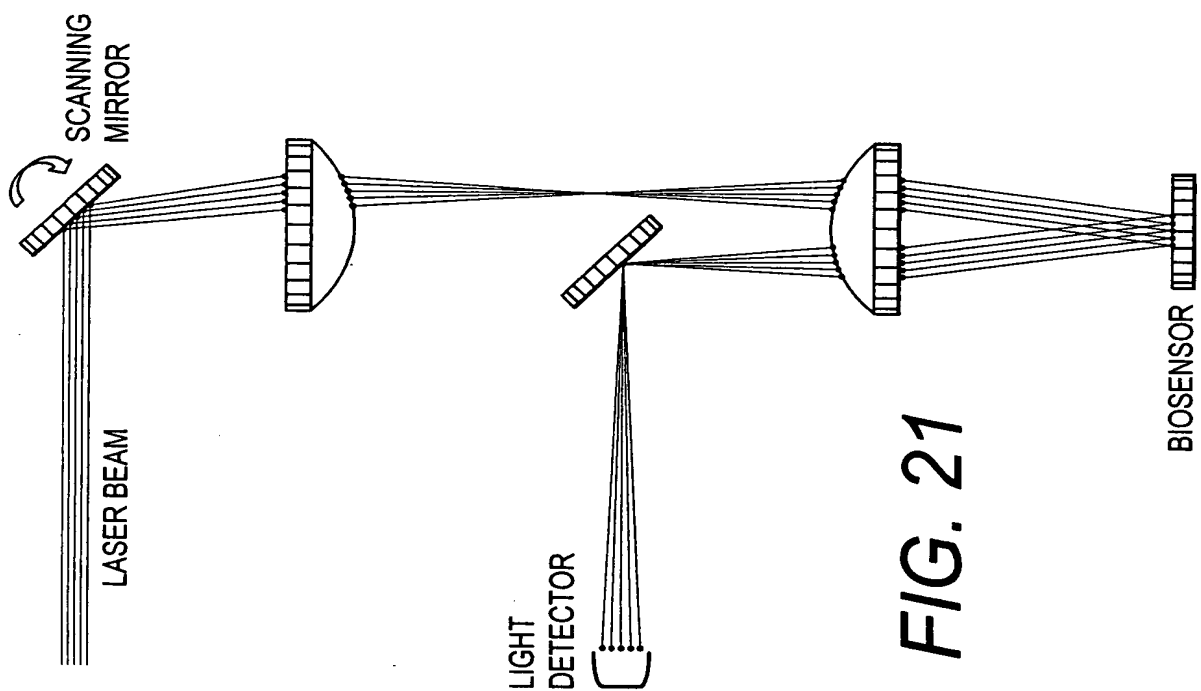
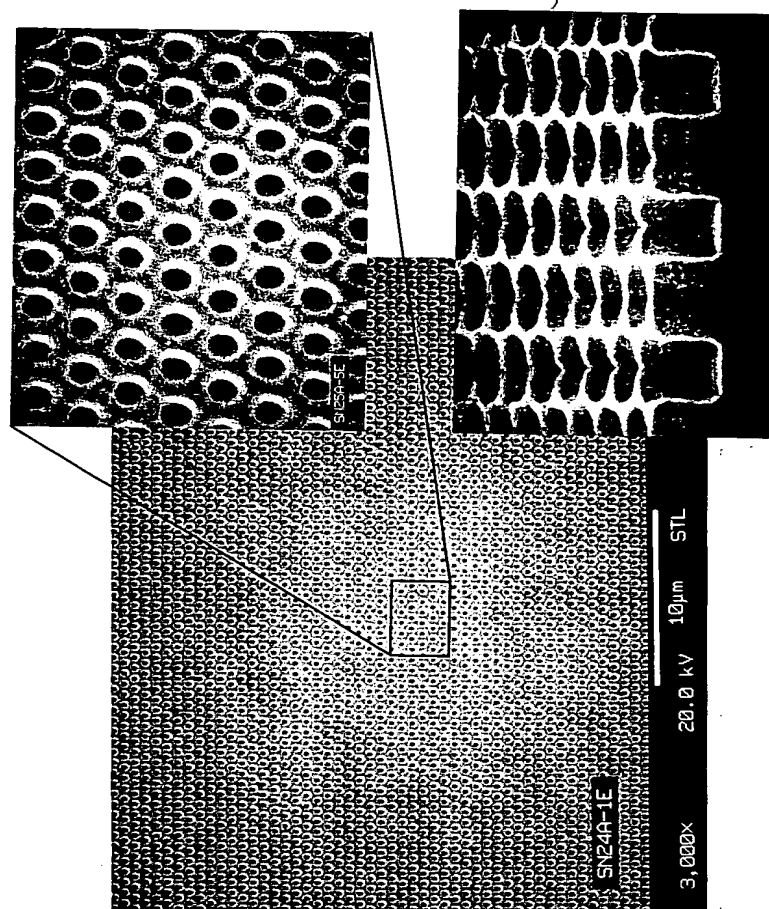


FIG. 21

FIG. 22



Replacement Sheet

FIG. 23

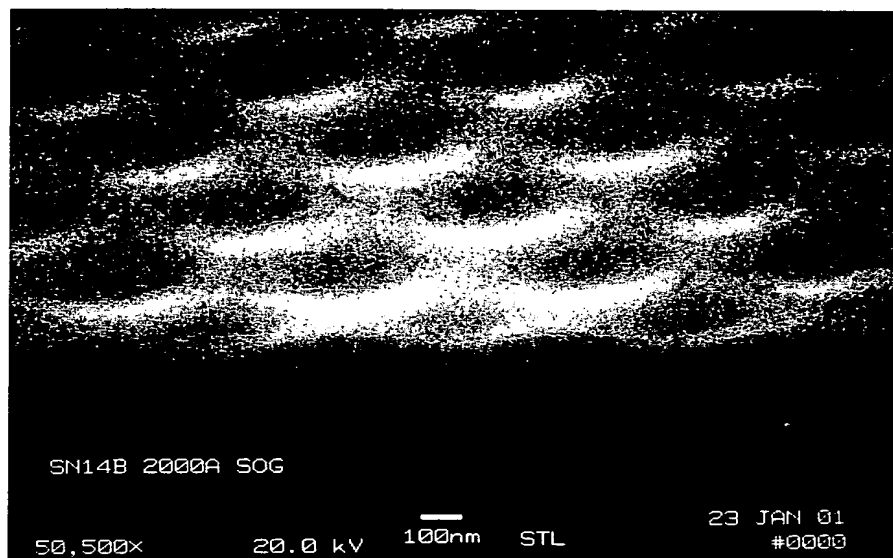
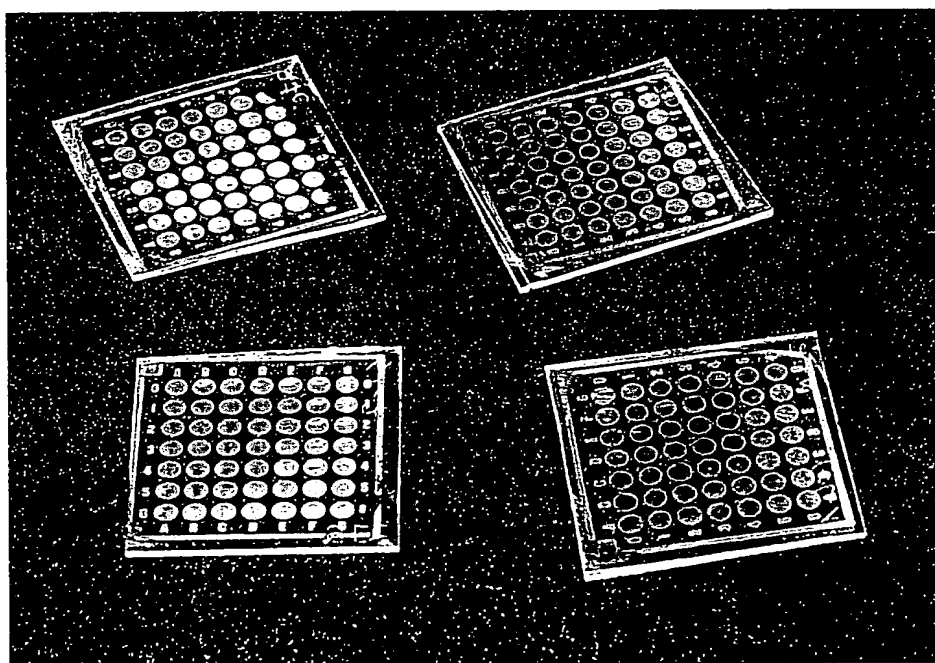
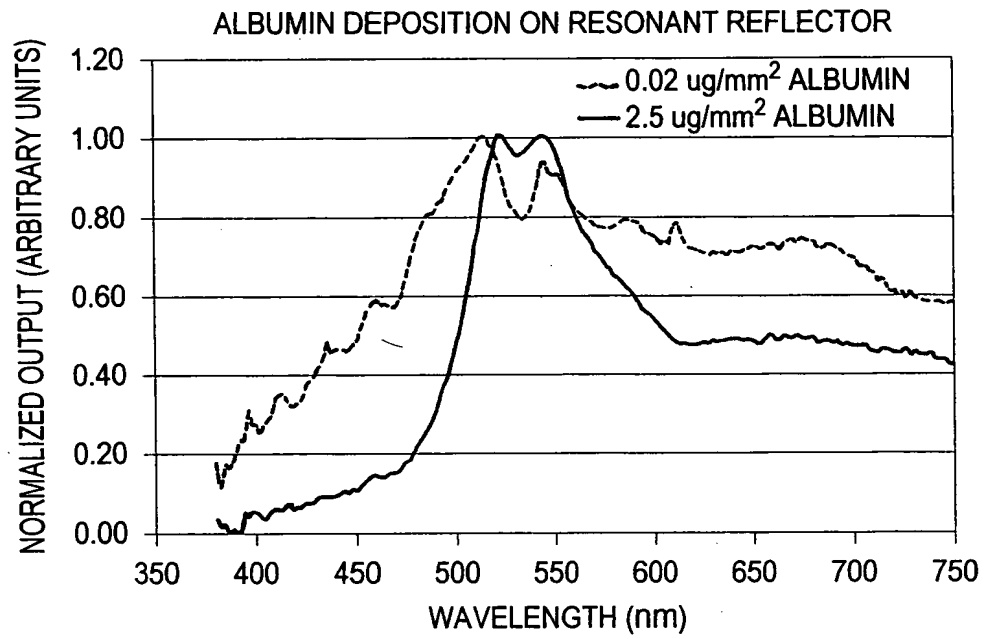


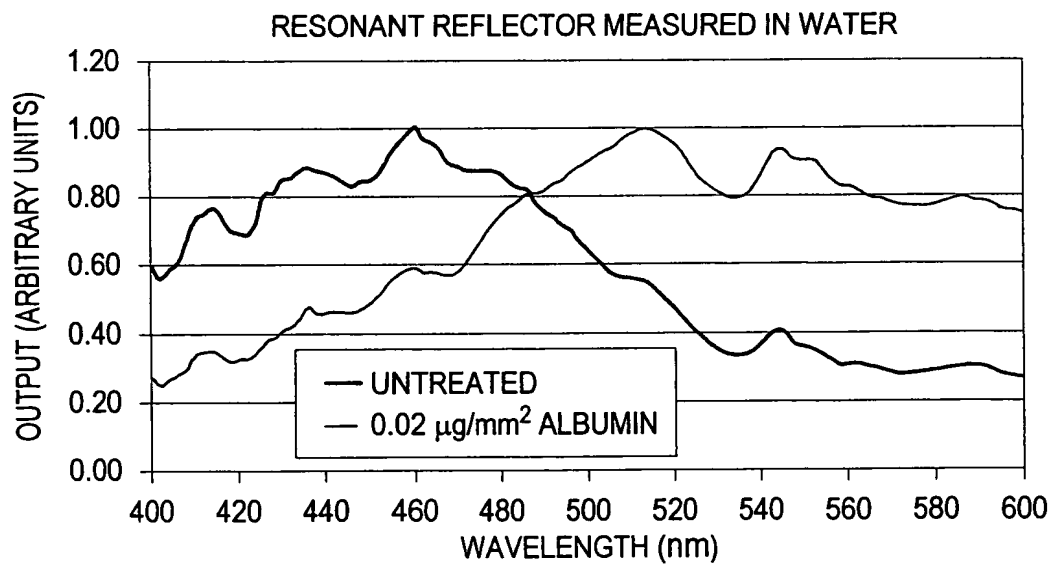
FIG. 24



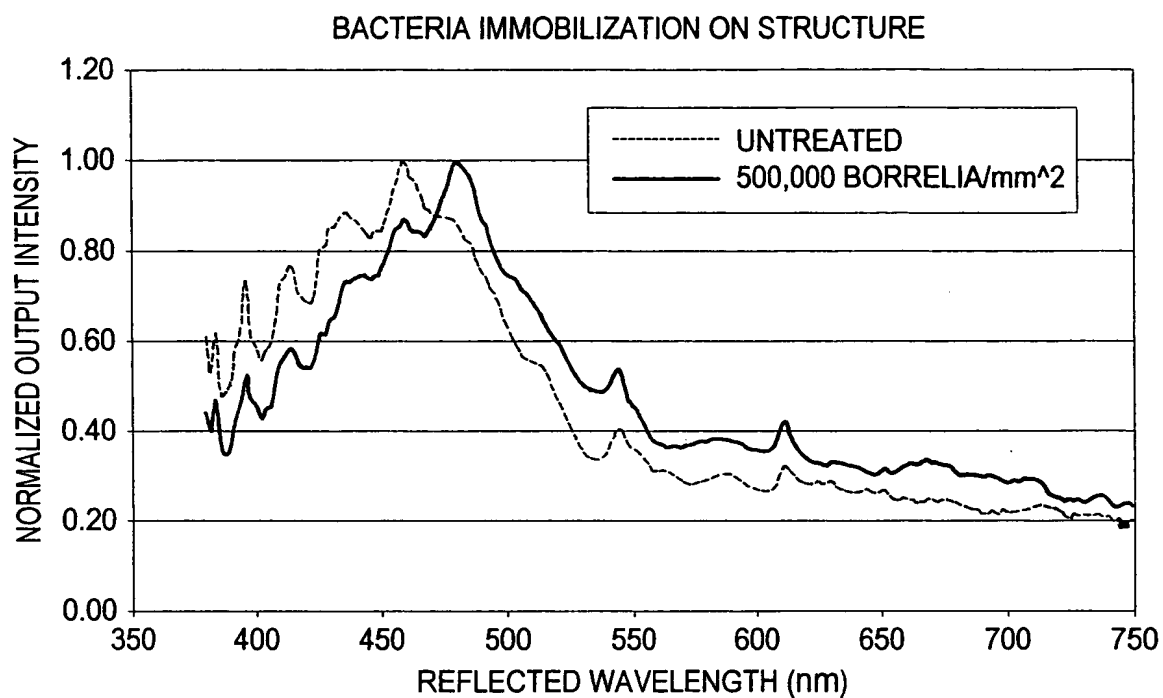
**FIG. 25**



**FIG. 26**



**FIG. 27**



**FIG. 28**

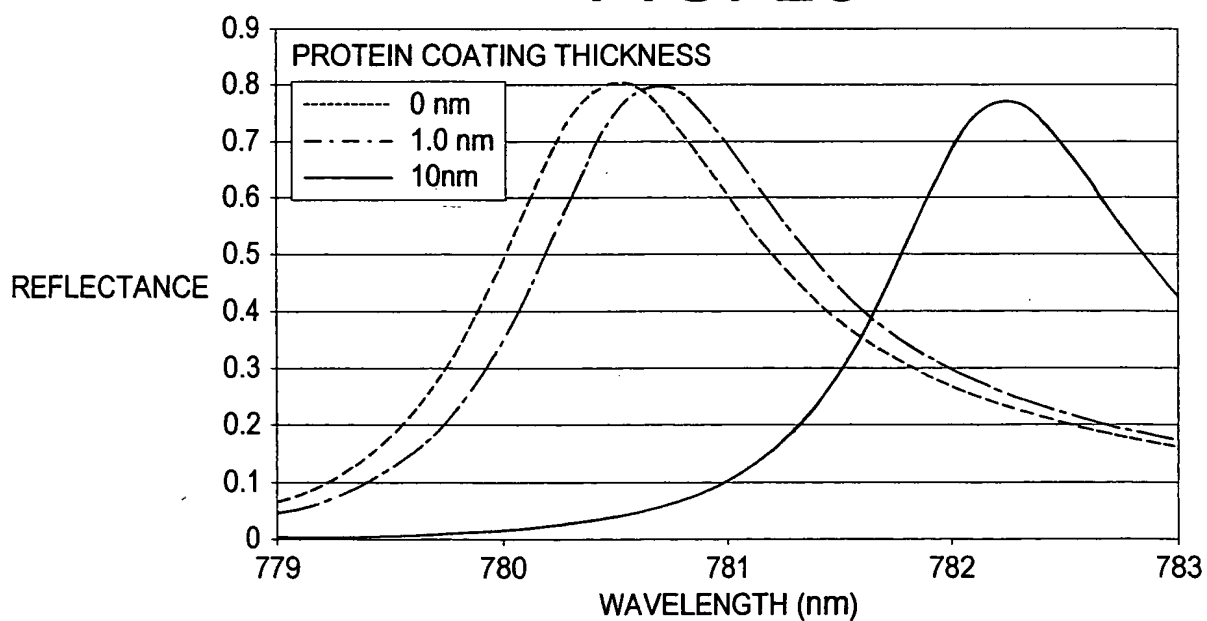


FIG. 29

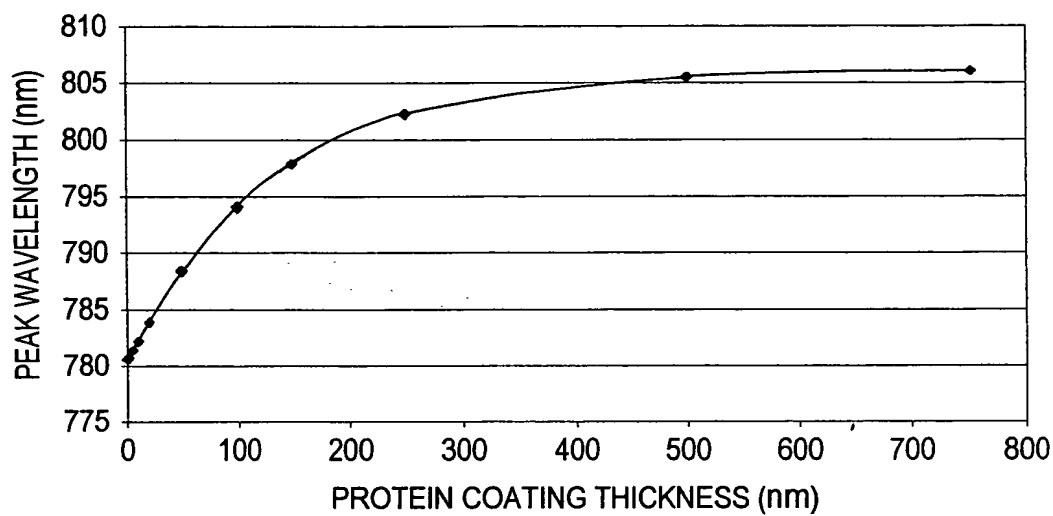
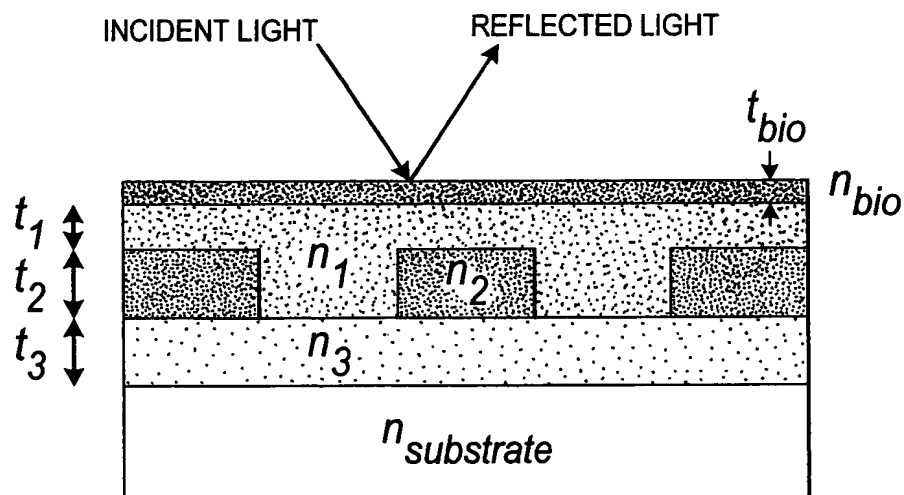
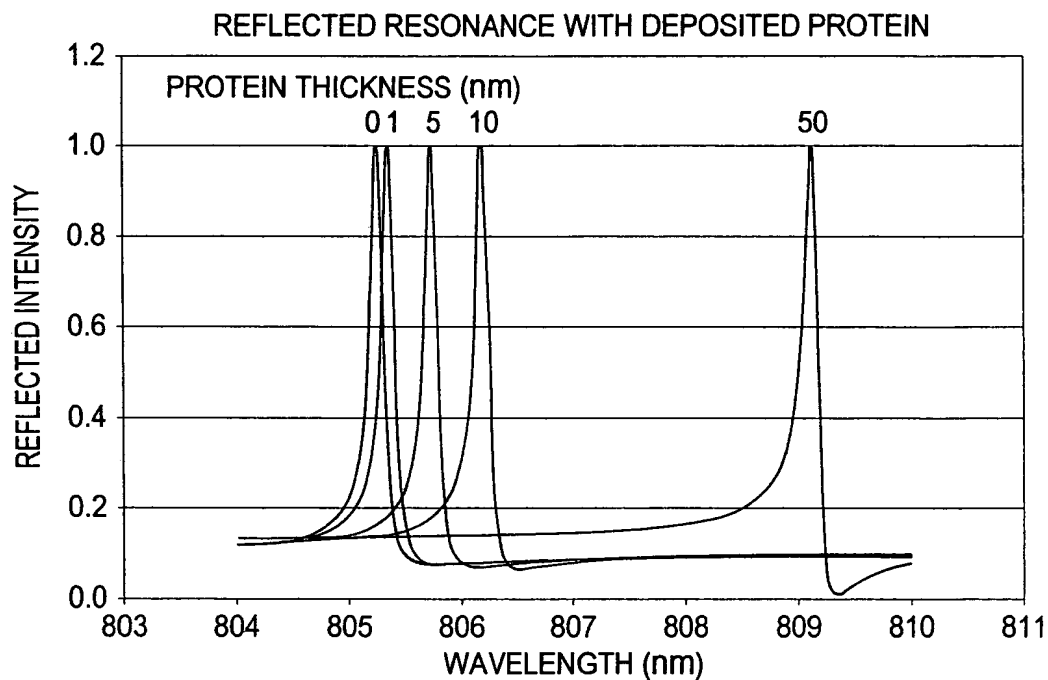


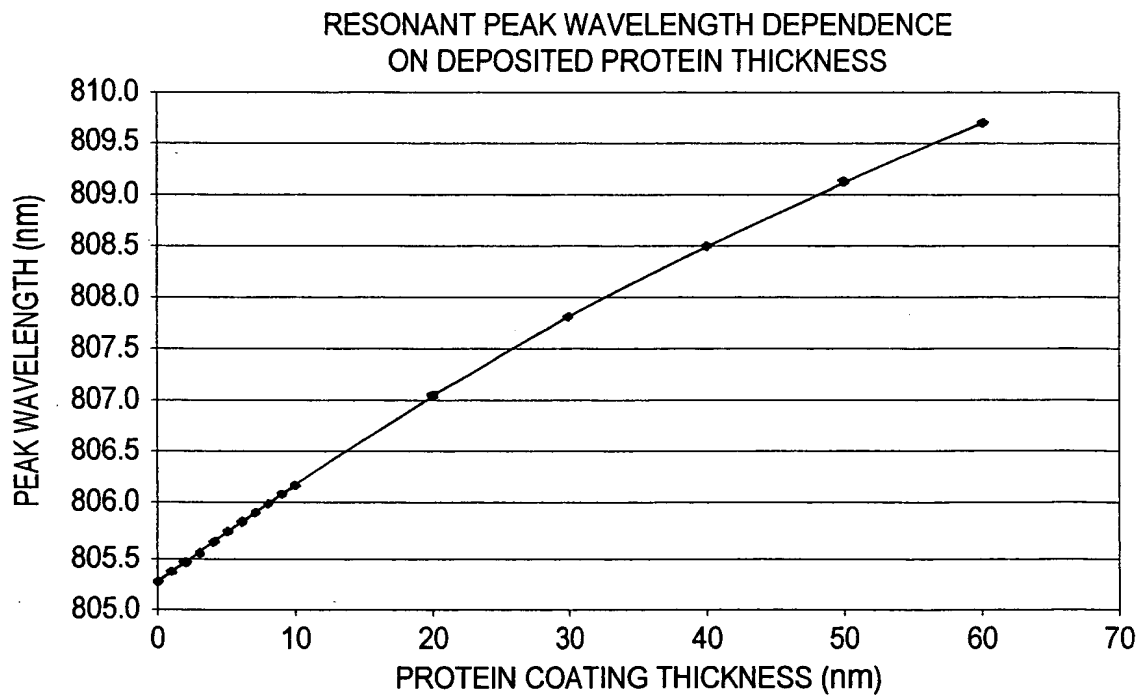
FIG. 30



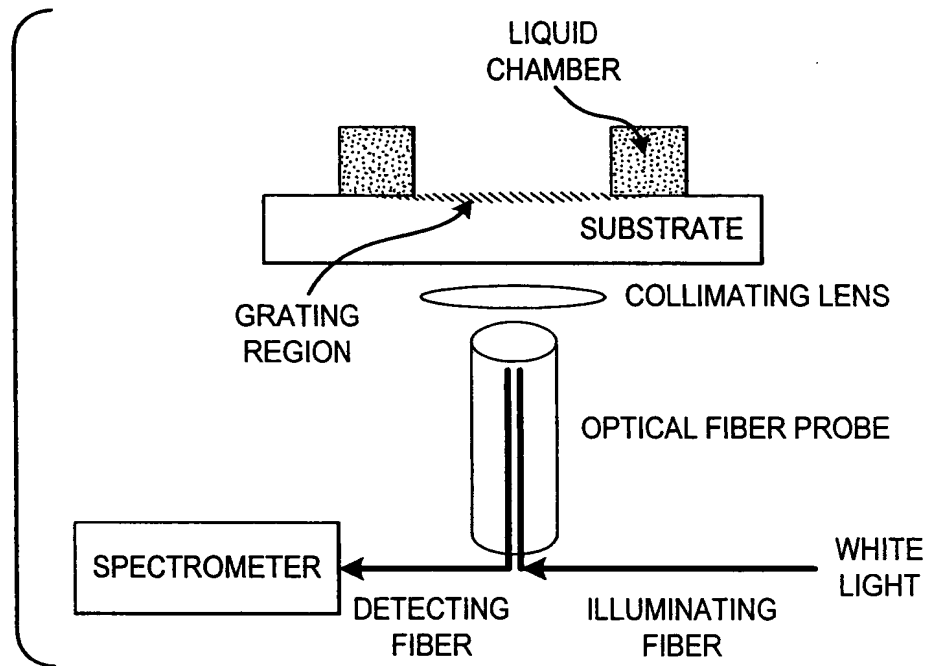
**FIG. 31**



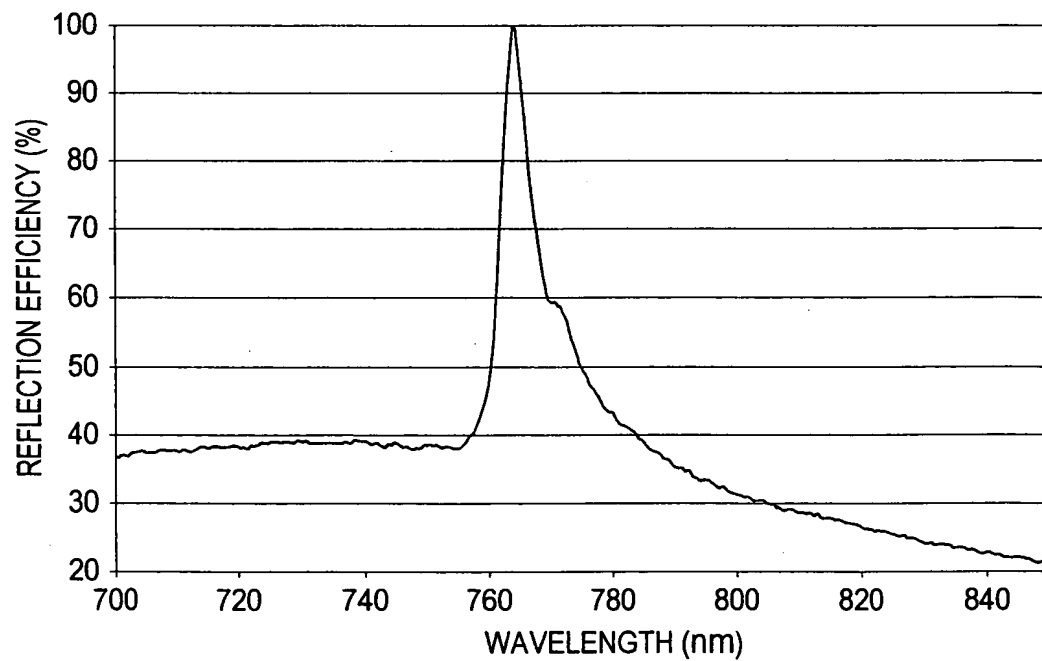
**FIG. 32**



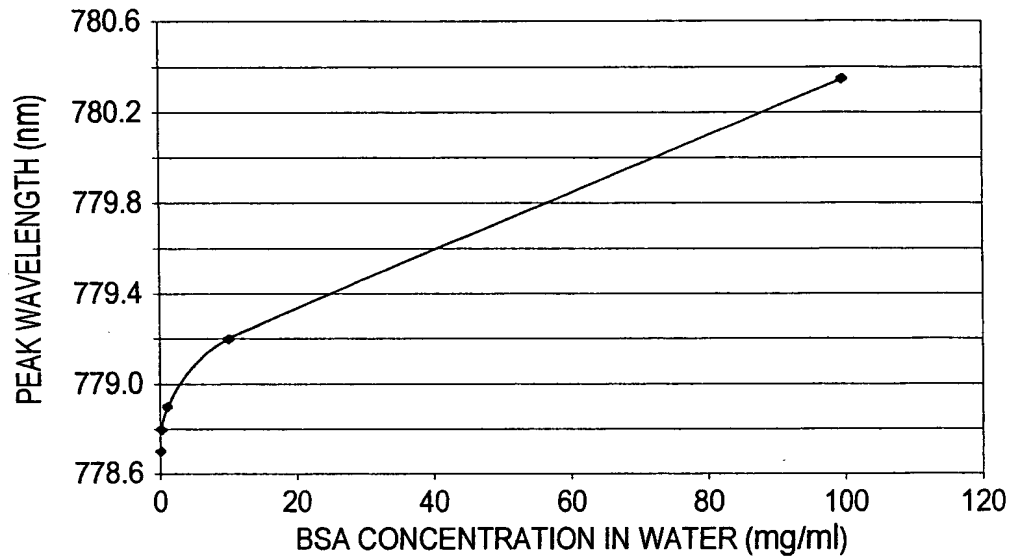
**FIG. 33**



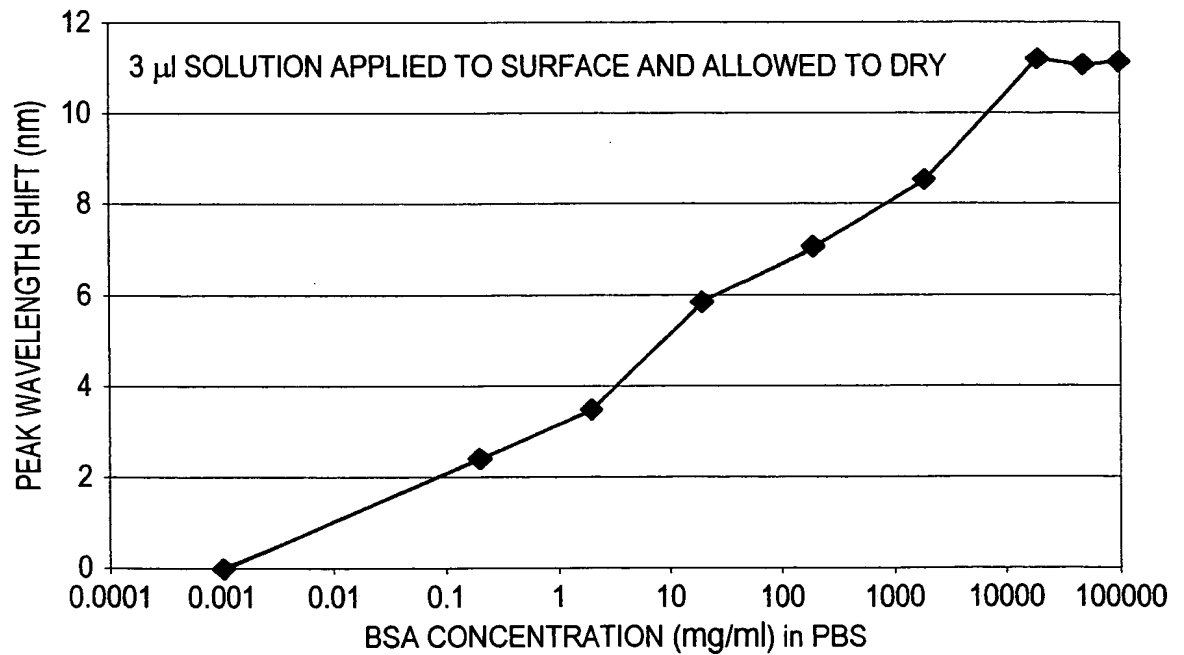
**FIG. 34**



**FIG. 35**

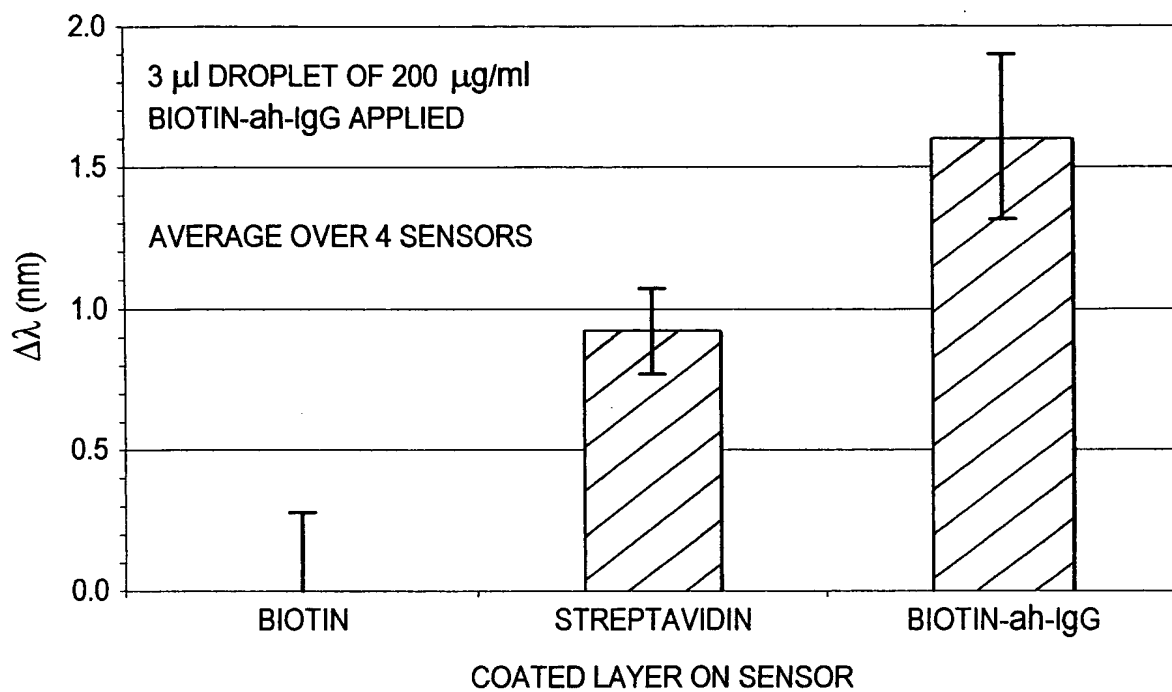


**FIG. 36**

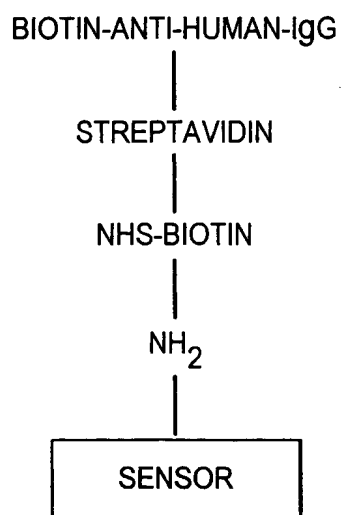




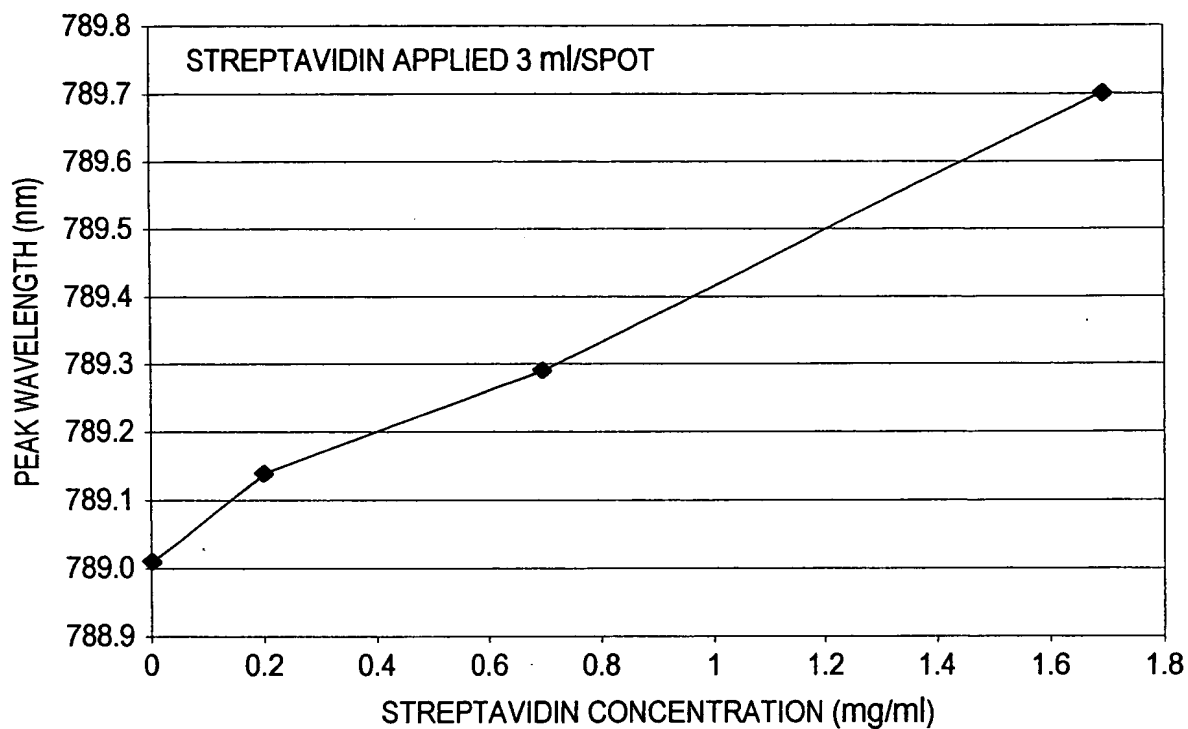
**FIG. 37A**



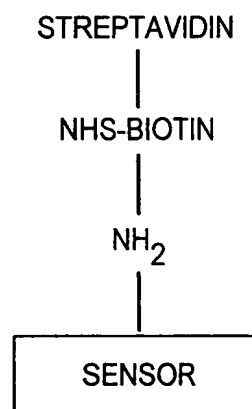
**FIG. 37B**



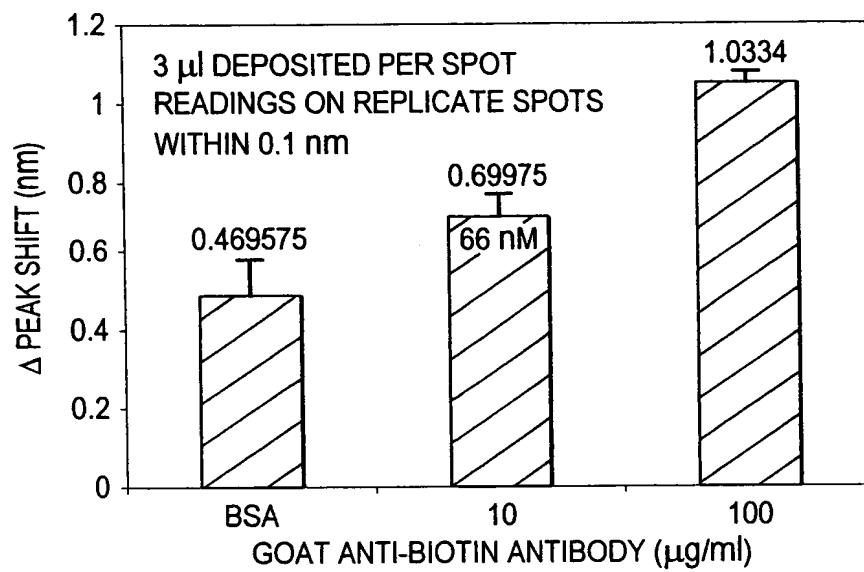
**FIG. 38A**



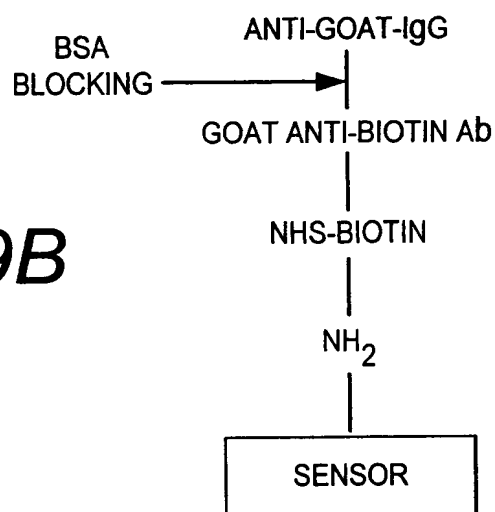
**FIG. 38B**

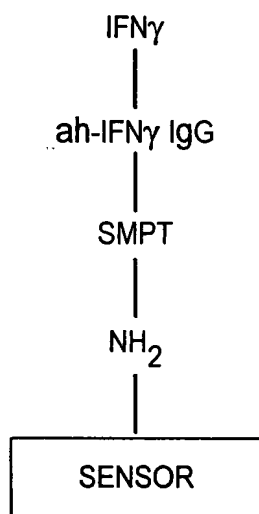
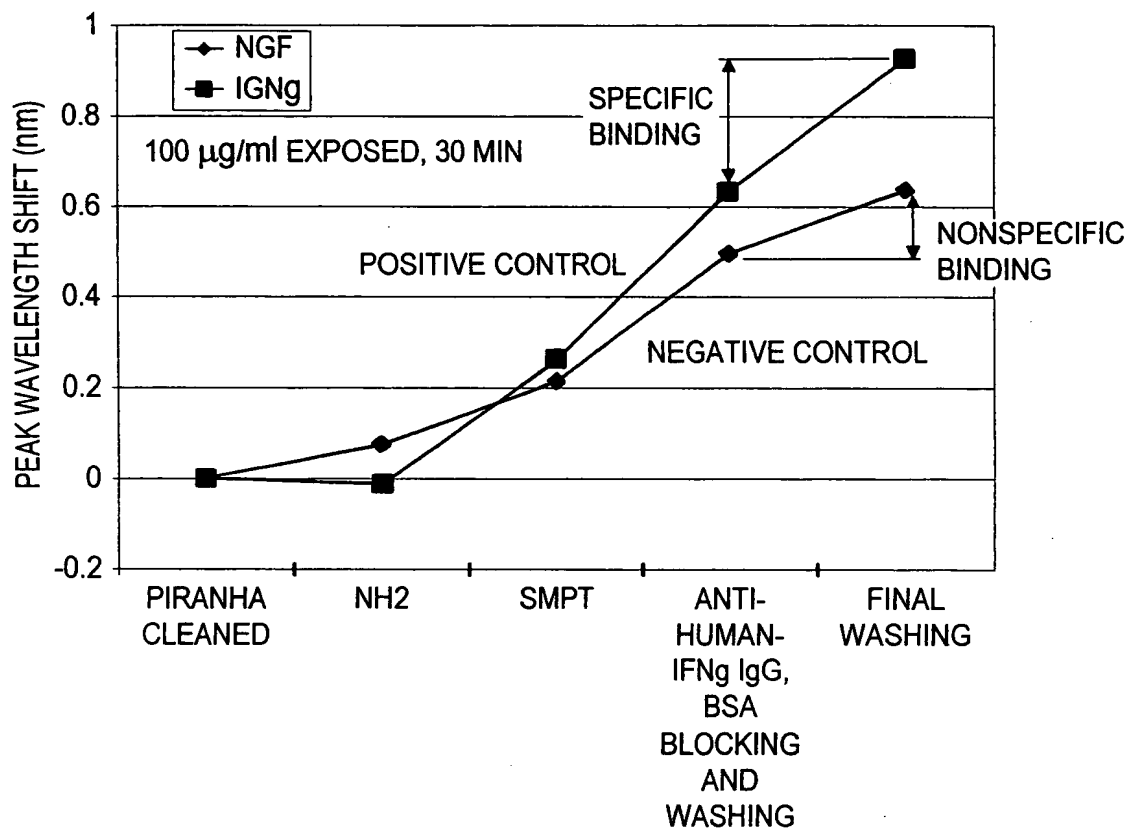


**FIG. 39A**



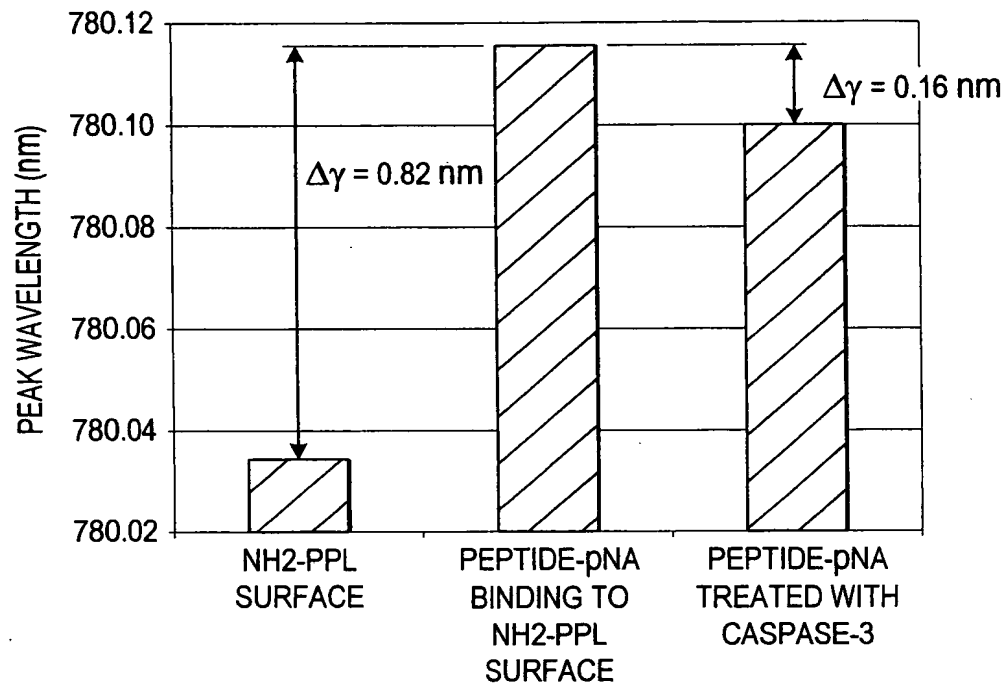
**FIG. 39B**



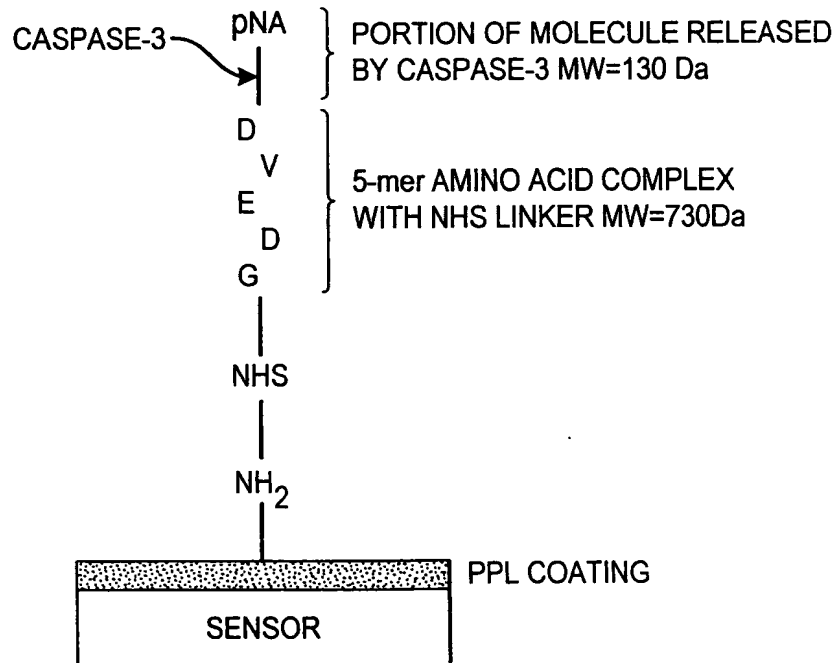


**FIG. 40B**

**FIG. 41A**

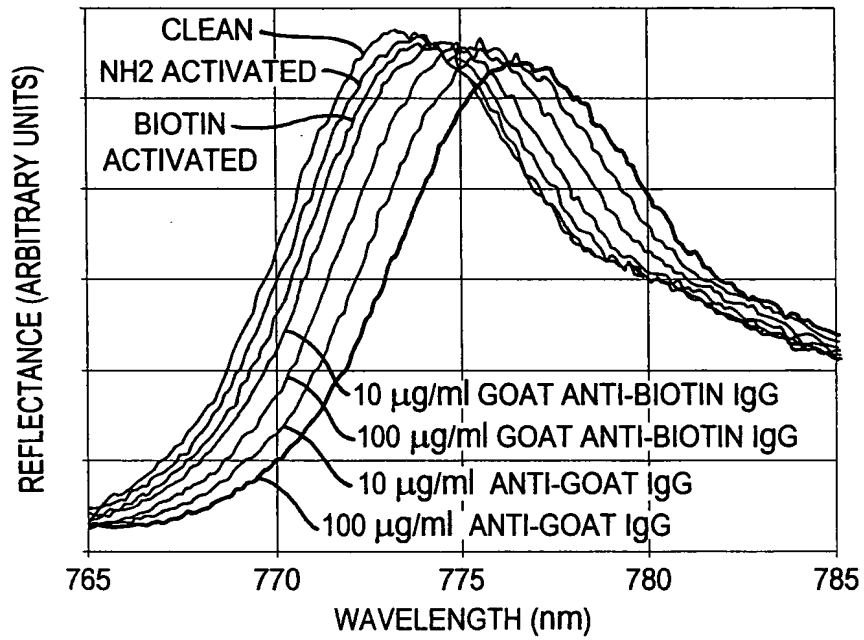


**FIG. 41B**

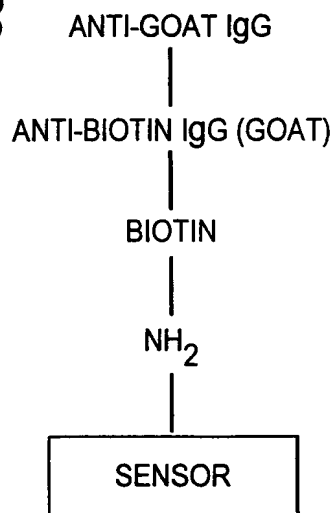


## FIG. 42A

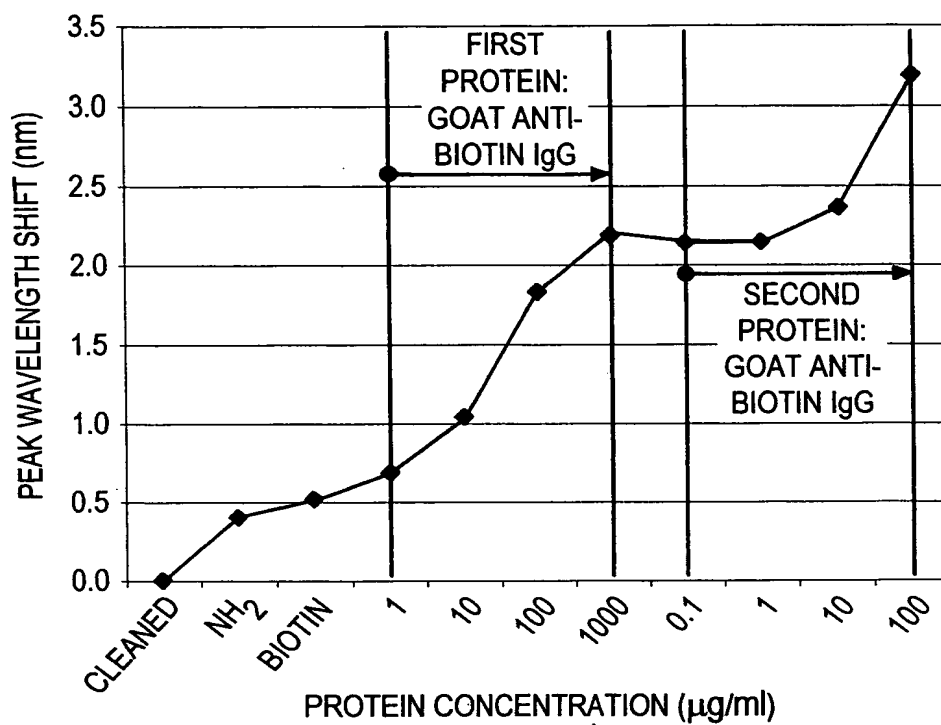
MEASURED SHIFTING OF THE RESONANT WAVELENGTH CAUSED BY THE BINDING OF VARIOUS BIOMOLECULAR LAYERS.



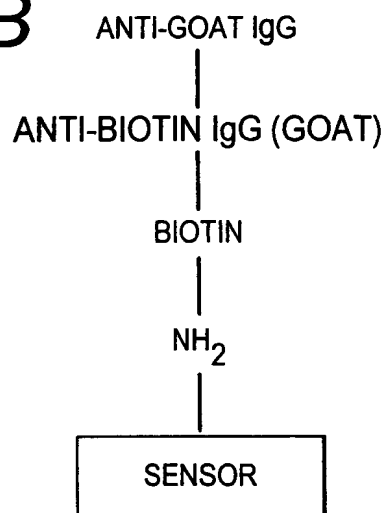
## FIG. 42B



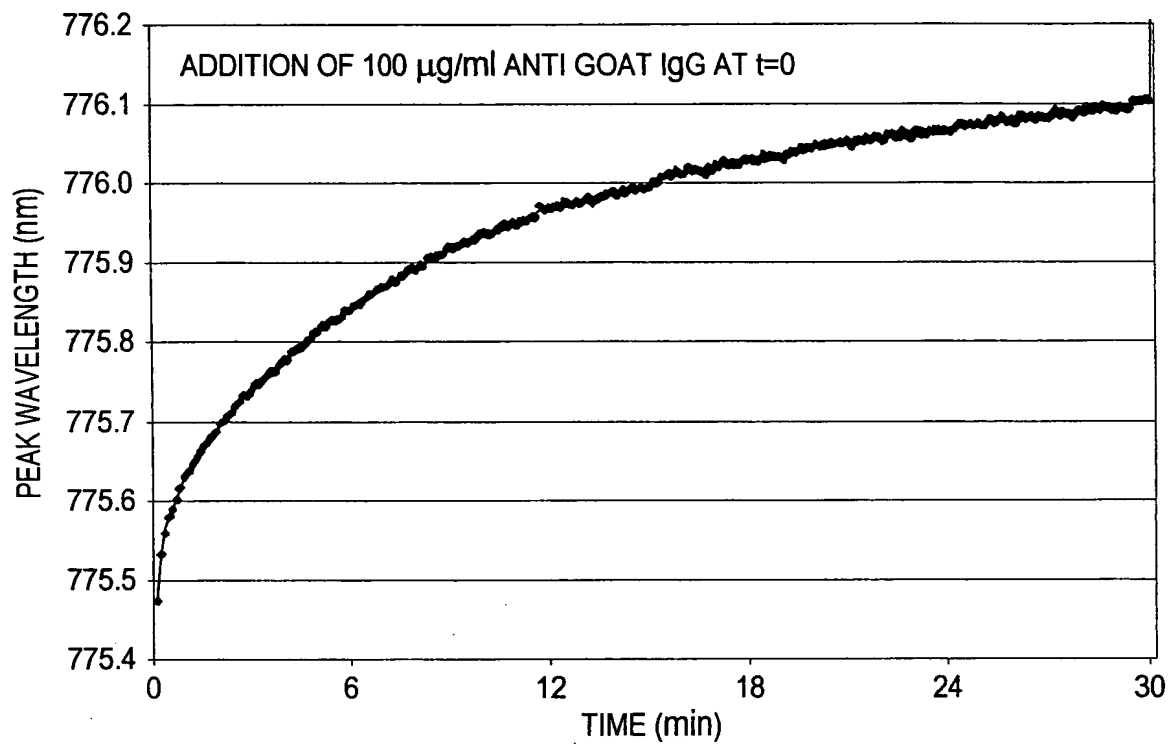
**FIG. 43A**



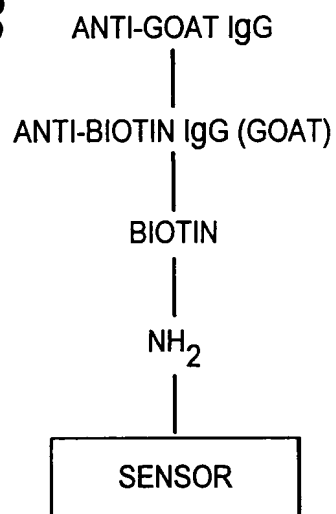
**FIG. 43B**



**FIG. 44A**

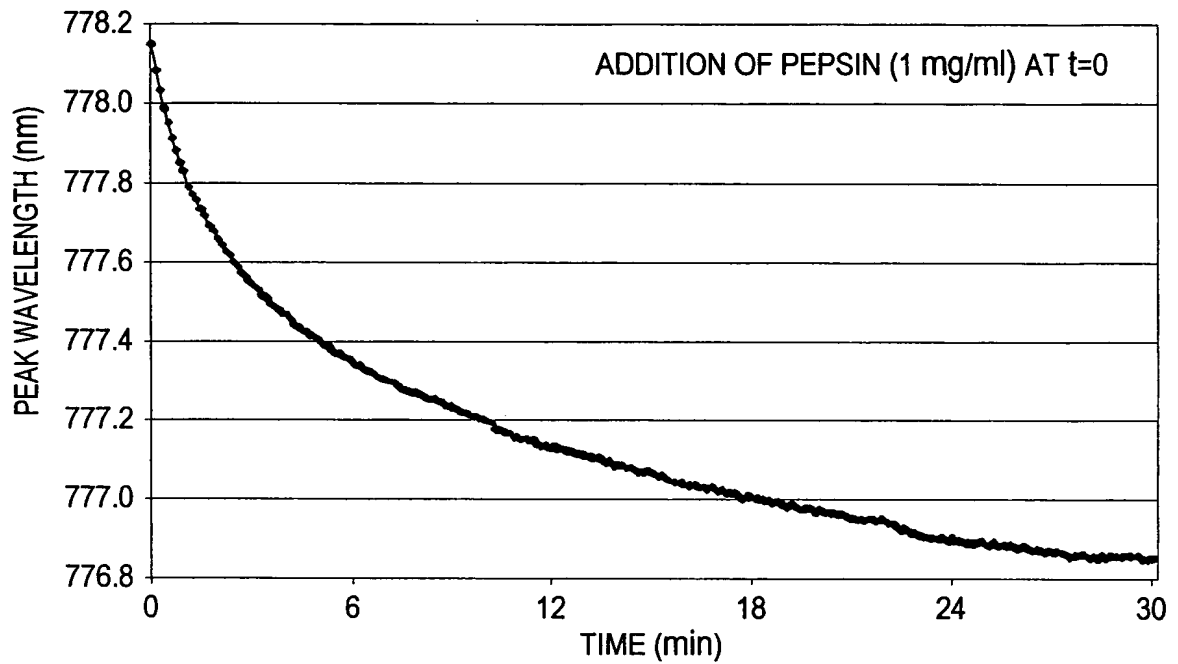


**FIG. 44B**

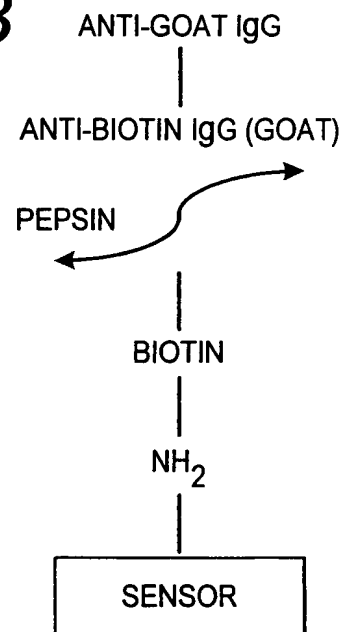




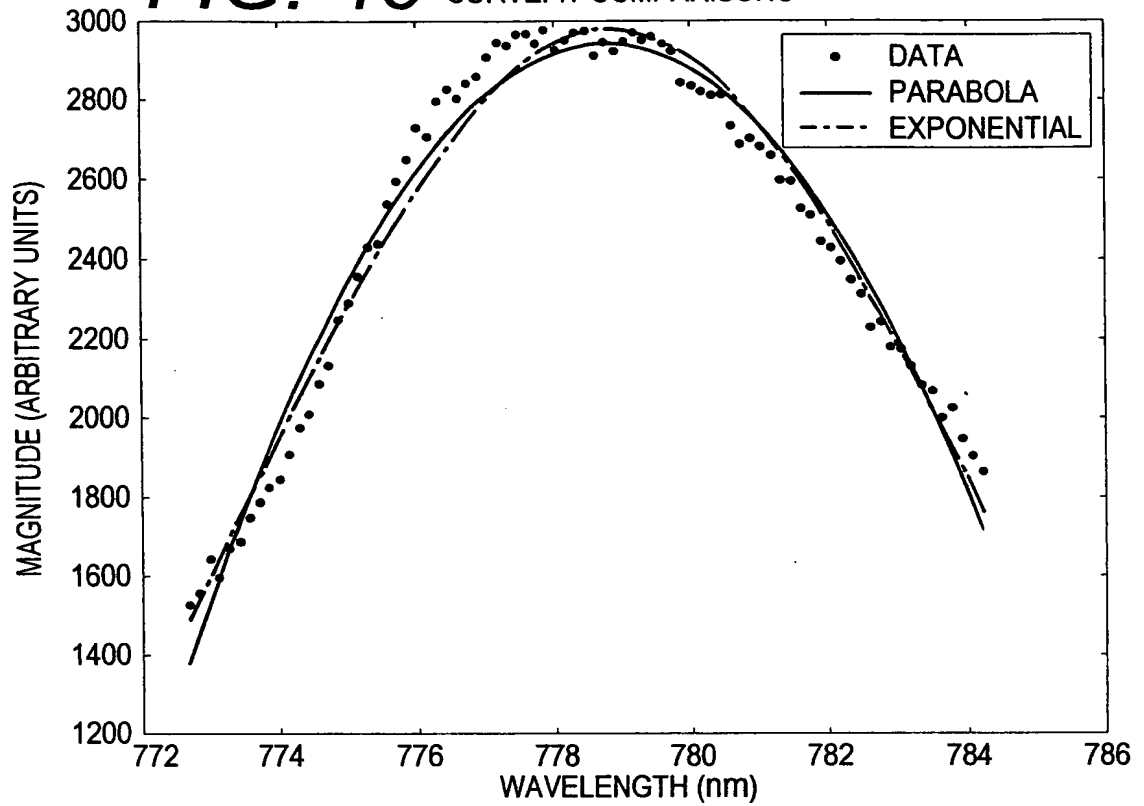
**FIG. 45A**



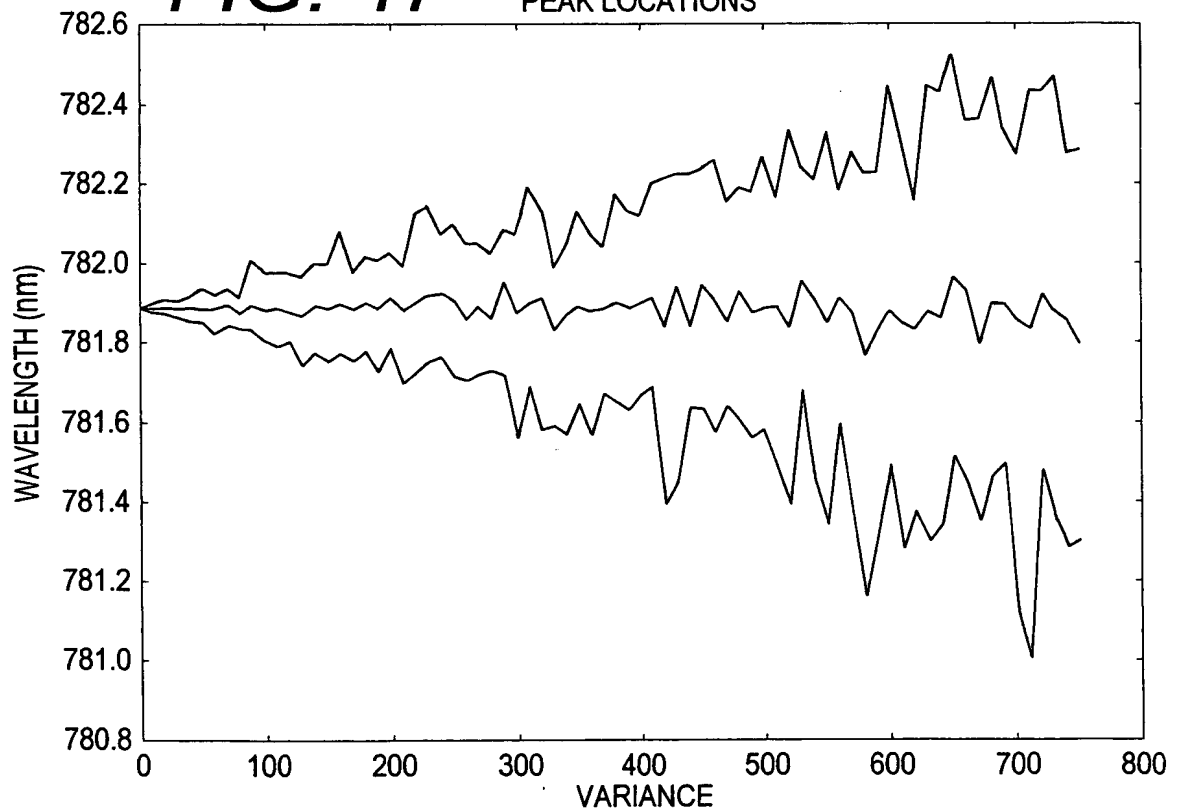
**FIG. 45B**



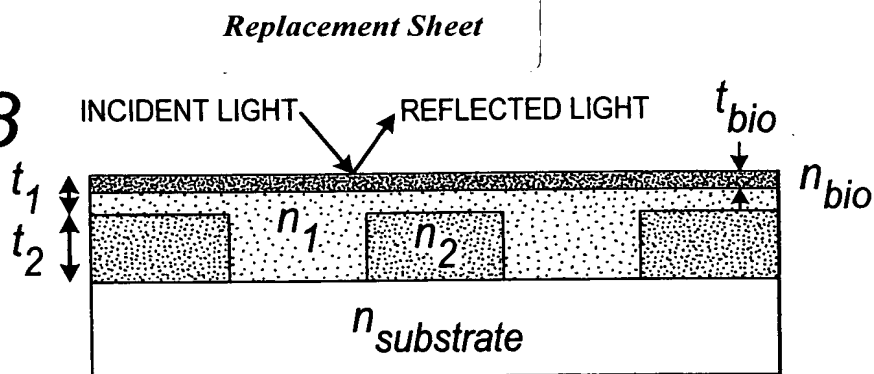
**FIG. 46** CURVEFIT COMPARISONS



**FIG. 47** PEAK LOCATIONS

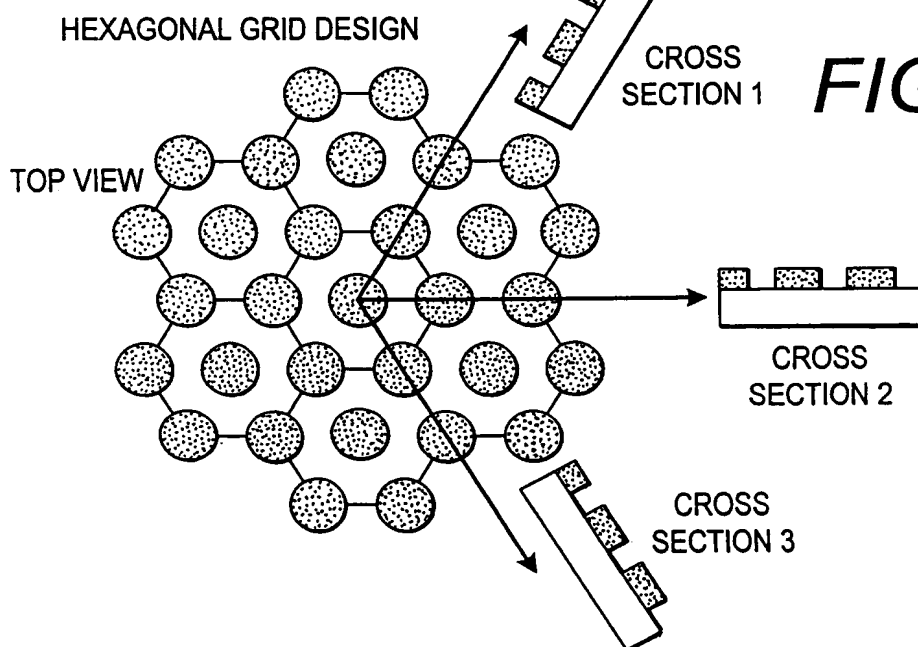
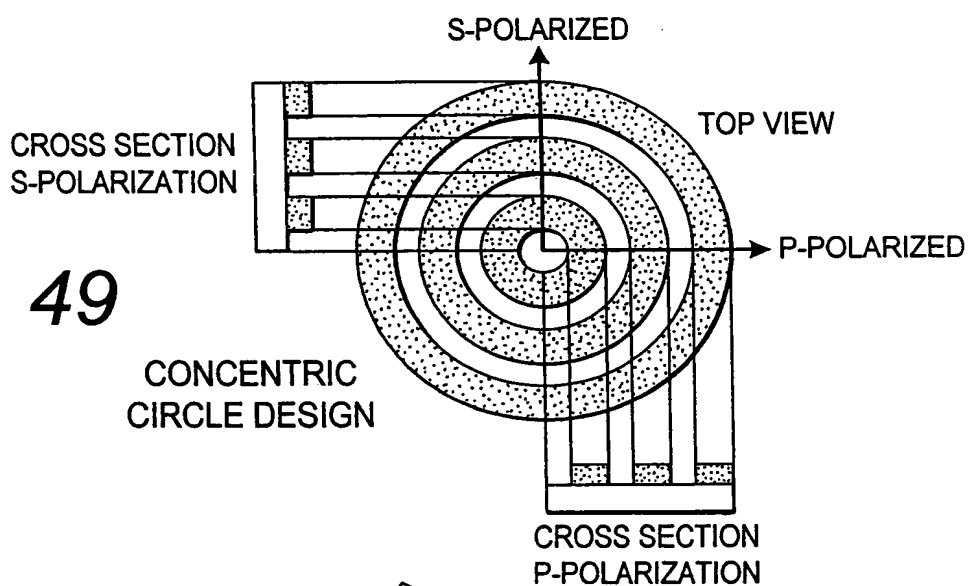


**FIG. 48**



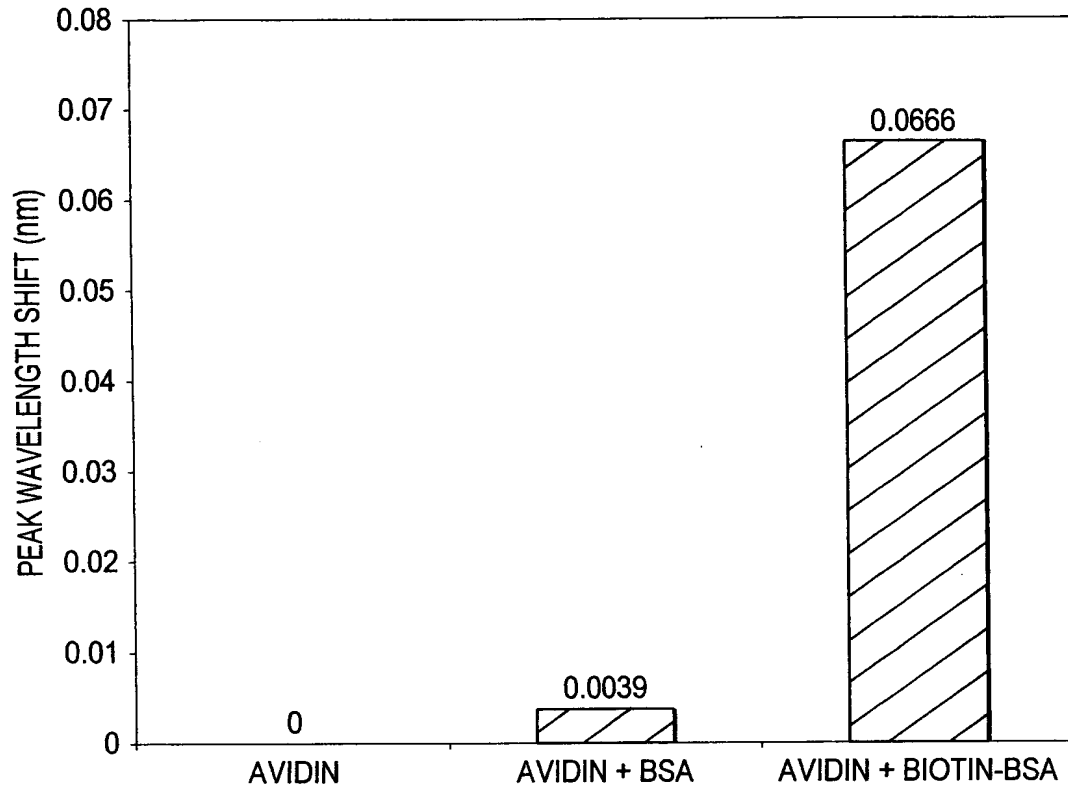
MATERIAL 1 = ELECTRICAL INSULATOR (PHOTORESIST, EPOXY, GLASS)  
 MATERIAL 2 = INDIUM TIN OXIDE CONDUCTOR  
 SUBSTRATE = GLASS

**FIG. 49**



**FIG. 50**

**FIG. 51**



**FIG. 52**

